STEEL
The Metalworking Weekly

NOVEMBER 28, 1955
Vol. 137 No. 22

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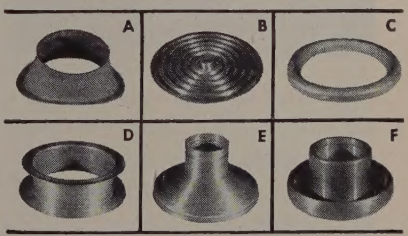
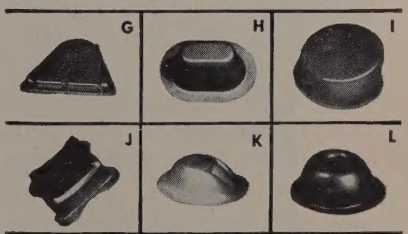


METAL SPINNING AND SPINFORMING:
Typical items: A—Aircraft detail; B—Decorative cover; C—Retainer ring; D—Winding reel; E—Electronic shield; F—Electrical detail.



HYDROFORMING:
Typical items: G—Aircraft detail; H—Spindle cover; I—Aircraft detail; J—Auto bracket; K—Light reflector; L—Air cleaner.

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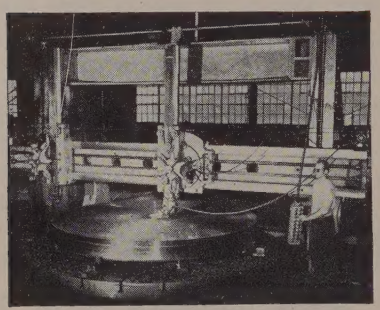

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behind the scenes

Wear and Tear

Everything in the world is assembled from raw material that consists of a fixed number of elements. Doughnuts, fishhooks and men come from the same master mix, and even diamonds and halitosis are distant cousins by reason of a carbon relationship. And everything in the world, no matter how it is assembled, is striving every minute to break up into its original components. Even man, a creature highly esteemed by most of us, is little more than a biological respite between genes and disintegration. Indeed, Leonardo Da Vinci once made a note that man, in his opinion, was little more than a passageway for food.

In the face of evidence that disintegration, dissolution and wear are the inevitable partners of all things under the sun, Associate Editor Van Caldwell sat down to consider what might be done about it. "Wear," he said, "is a fact of life. Nobody seriously considers getting along without it. The problem is to get along *with* it."

So Van tore into the problem, and after six months of research, he began to appreciate the obstacles. He felt like a man attempting to stuff an adult and vigorous octopus into a milk bottle. There were so many points to consider, he couldn't pin them all down. Like love, wear is a many splendored thing; it manifests itself in abrasion, friction, impact, vibration, corrosion and heat, and if you wish to fight these things in an effort to preserve and maintain your equipment and inventories, read "War on Wear," (page 98).

Booming Electronics

What are electronics doing these days? (Or should it be what *is* electronics doing? Reminds us of the editor who bawled out a reporter for confusing compound subjects and predicates. "Did you dig up any news today?" he bellowed. "No sir," said the reporter. "Not a single new.") Well, electronics are—or is—big news today. Associate Editor Stan Stewart investigated this booming industry and reports his findings on page 65. Stan says that electrons constitute cathode rays and beta rays, and are emitted by all hot bodies, but the only rays that really interested him were the hoorays emitted by manufacturers and distributors of electronics. Fifteen years ago the business was scarcely worth bothering about; this year its sales will reach about $9.5 billion!

Pssst! Income Tax!

We hate to be the first to remind you that income tax time will soon be upon us; well, it *seems* to creep upon us mighty rapidly. However, before you sit down to do battle with those gobbledygook directions, you migh do well to investigate a *New Dictionary of Income Tax Terms,* published by Commerce Clearing House, Chicago. This handy aid to sanity contains definitions of over 200 words and phrases which come out of the revenue code, or have developed special meanings—like "spin-off," "downstairs merger," "sum of the years digits," "declining balance," "away from home" and "involuntary conversion."

The tax significance of such phrases is clearly explained in the new dictionary. By the time you have mastered the definitions, all you have to do is figure out how to raise the money to pay the taxes.

The Bored Farmer

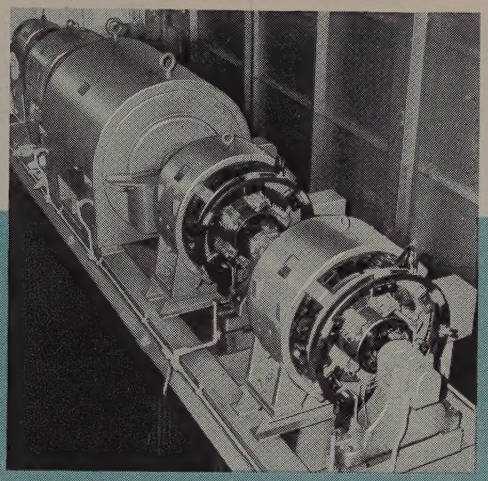
Miller the driller was a man who never gave up when he started a job. Failing on his first attempt to find oil under Mt. Olympus, down in New Zealand, he bored straight on through the center of the earth. When Miller's drill pushed through on the opposite side of the earth, a farmer who had risen early rose again, because the bit came right up through the seat of his chair.

Now, the farmer swore in alarm, and sent a message to his city cousin, who lived in the largest town in the district, about 60 miles away. What language did the farmer speak, and where did his cousin live?

Shrdlu

(Metalworking Outlook—Page 59)

Ohio Works...



Elliott motor-generator set which converts incoming 2300-volt, 25-cycle power supply to adjustable voltage d-c. Two 250-kw generators in foreground supply bucket hoist and bridge travel motors. Larger 400-kw generator, in rear, supplies power for motors which drive the trolley.

When increased blast furnace capacity required the installation of two new ore bridges at the United States Steel Corporation's Ohio Works, Youngstown, Ohio, designers incorporated all the most modern innovations and features. By using adjustable voltage electrical control, bridge motions are controlled more precisely and smoothly. Speed control is improved and hoisting speed is increased. In addition, greater bridge capacity is obtained without increase in the size or number of motors by operating the motors at near double-rated voltage and double speed. As the original power supply is a-c, no increase in d-c capacity of the plant is necessary. Other important advantages are less maintenance and less over-all power consumption.

BY ELLIOTT

All major electrical equipment, including controls, was furnished by Elliott Company. Both Elliott engineers and Elliott equipment are thoroughly at home in steel mill operations. Take advantage of this experience. Consult your local Elliott field engineer or write Elliott Company, Crocker-Wheeler Division, Jeannette, Pa. for full information.

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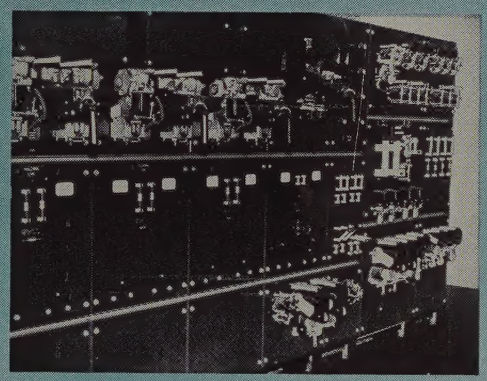
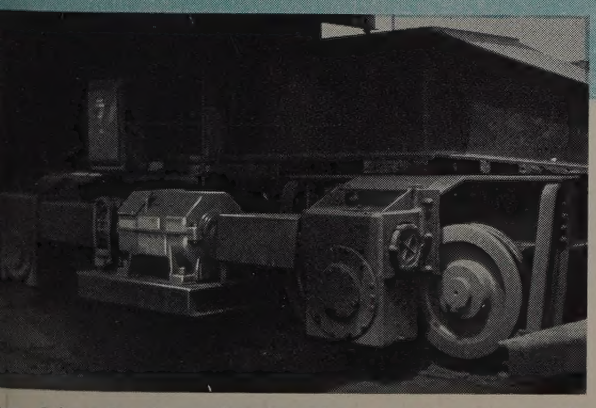
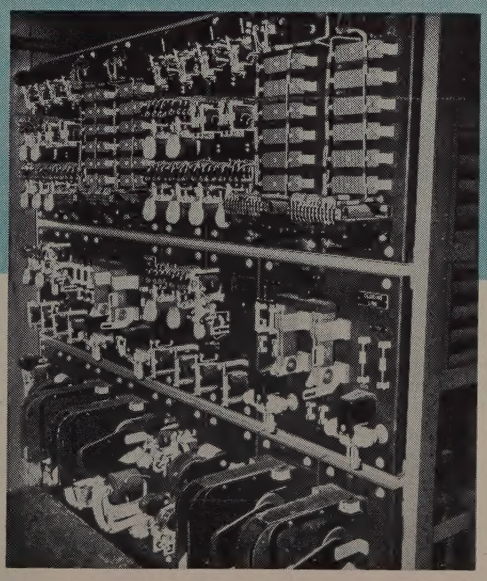


Control for the generators, located in the enclosed, pressurized motor-generator house.



One of the pairs of two-rail trucks which support the pier leg of the bridge. A 100-hp Elliott mill type motor, equipped with brake, drives each truck.

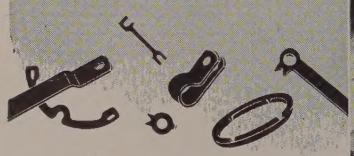


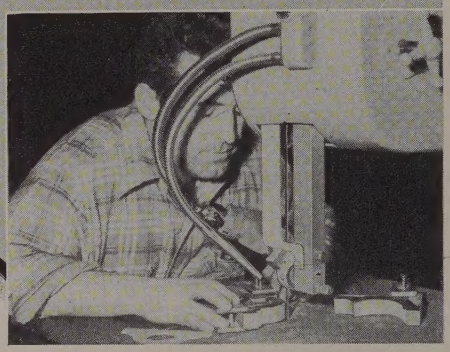
Part of the adjustable voltage control equipment furnished by Elliott for each bridge. This is a portion of the motor control installed in the trolley cab.

WS-11

YOU *Can* AVOID DIE COSTS COMPLETELY!

On Your Next
STAMPING ORDER





Yes, you can – but it's not *necessarily* the best thing for you.

You want the lowest unit cost – *for the life of the part*, including re-runs. It may well be that our **Machine-Cut Method,** with no die cost, does work out best.

Or, it might better be our **Short Run Method,** using economical blanking dies and stock punches.

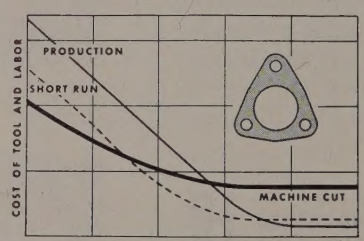
Sometimes, even with very short runs, it pays to use our **Production Method** with a standard die or our own surprisingly inexpensive Hecht-type tool.

In *any* case, the decision is a technical one based on many factors, not just length of run. You save money when the correct decision is made.

WE USE ALL THREE METHODS — LET US MAKE AN IMPARTIAL DECISION FOR YOU

For example, take the part illustrated. From 1-65 parts, our Machine-Cut Method is most economical. At 65 parts, the Short-Run Method is best until, at 7,000 units, the standard Production Method is most satisfactory.

These breaking points as charted vary drastically with every stamping, but the general principle remains the same.



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STREET_____

CITY_____ ZONE_____ STATE_____

LETTERS TO THE EDITORS

'Pricing' Editorial Praised

Your editorial, "Why Cut Prices? (Nov. 14, page 57), is one of the bes on the subject of pricing that I hav seen. Please rush 100 reprints.

J. C. Sea
Executive Secretar
American Gear Mfrs. Associatio
Washingto

Article Ideas Adopted

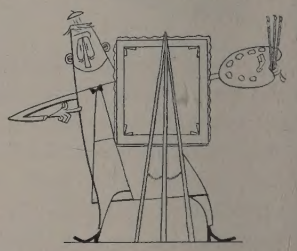
Your 1955 Program for Managemer series was brought to our attentio through the eighth article, "Value Ana lysis: Equal or Better Performance a Lower Costs" (Sept. 19, page 101).

I would appreciate receiving tw copies of this article and one copy o the others in the series.

As a result of the value analysis arti cle, we have been reviewing our sys tem and are incorporating into it som of your ideas. It's too early to asse what we are doing, but there seems t be a good deal of enthusiasm generate as a result of this article.

R. G. Ns
Purchasing Dep
Arvin Industries In
Columbus, In

'. . . Artwork Saves Me Time'



We take practically every busine publication covering mechanical trad and/or new products. In 40 years, can truthfully say that your article and clever artwork save me the mo time and have the best summatio value.

Cory P. Ge
Vice President-General Manag
Industrial Devices In
Philadelph

Comment from Secretary

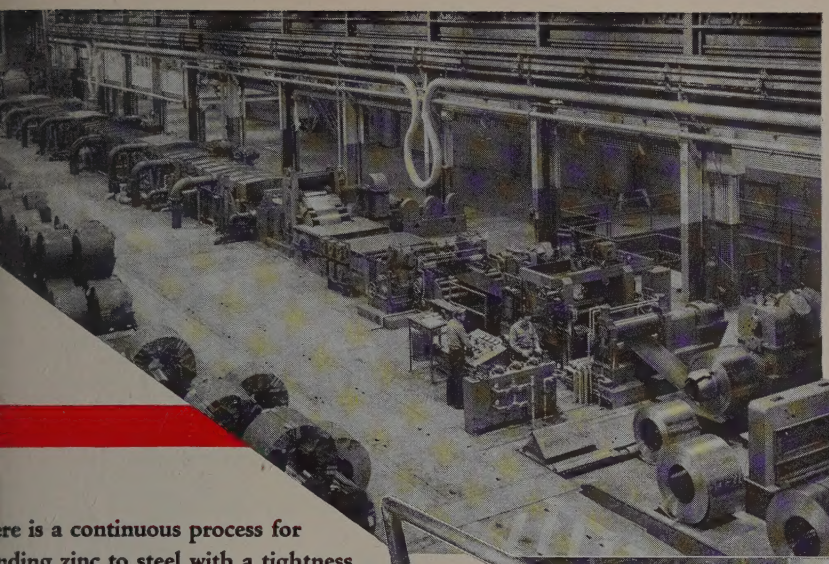
It seems to me that engineering pub lications should devote space now an then to the engineering secretary an her problems. In some cases, it coul be helpful to the better administratio of the engineering department.

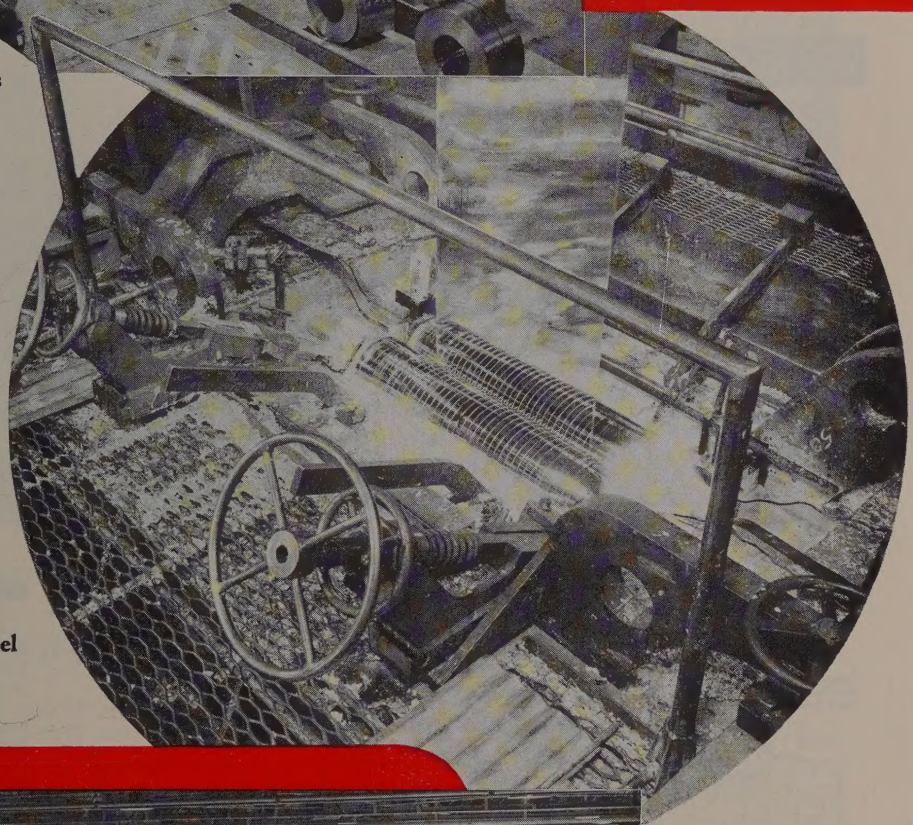
The engineering secretary not onl has problems common to all secretari but also problems unique to the en gineering department. Business course train the secretary, but the engineerin secretary, as far as I know, must lear by trial and error. An exchange of ide would be not only stimulating but help ful.

Because of new horizons and in creased complexity of design and pro duction throughout industry in all field the call is for engineers. Along wit

(Please turn to page 12)

THE MOST modern design for continuous galvanizing

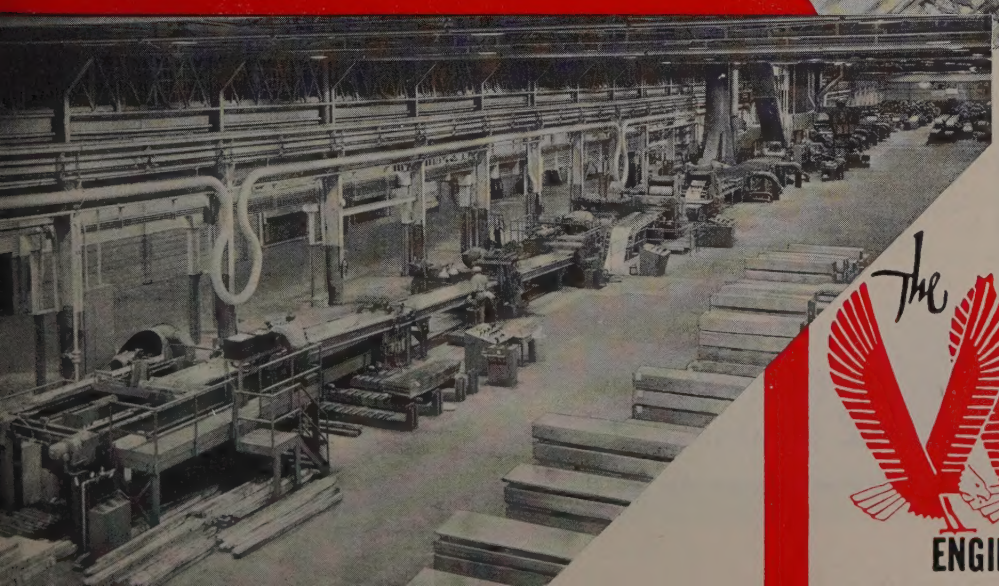




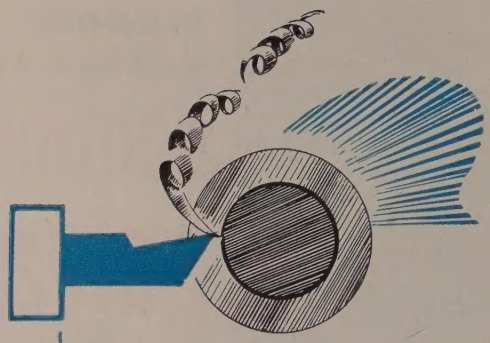
re is a continuous process for
nding zinc to steel with a tightness
t defies flaking and chipping
gardless of use.

further, enables producers to
ieve heretofore unobtainable
ibility and control of softness
d coating weight. It is an impor-
t advancement in coated steels
d is, as one steelmaker put it,
miracle of modern engineering."

uipment for the continuous coat-
of strip steels has long been a
ean Engineering specialty—and
equipment required for this con-
uous galvanizing line is no excep-
n. At present, Wean facilities are
avily engaged in meeting the
mands of the industry's leading steel
oducers for similar installations.



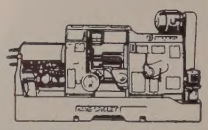
The WEAN ENGINEERING Co. Inc.



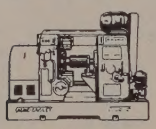
OUR JOB:

to provide the *Right Machine*

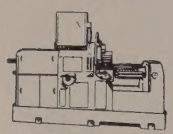
for **YOUR JOB**



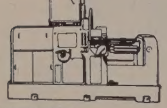
BAR AUTOMATICS
4 Spindle — 7 sizes; 1 to 7¾"
6 Spindle — 9 sizes; ⅜ to 6"
8 Spindle — 6 sizes; ⅝ to 4"



CHUCKING AUTOMATICS
4 Spindle — 2 sizes; 10 and 12"
6 Spindle — 4 sizes; 5¼ to 12"
8 Spindle — 2 sizes; 6 and 8"



TURRET LATHES
(Bar-Type — Fully Automatic)
Single Spindle — 3 sizes; 3½ to 5½



TURRET LATHES
(Chuck-Type — Fully Automatic)
Single Spindle — to 12" cap.

CHUCKING AUTOMATIC
Single Spindle ("Chuckmatic")
To 12" capacity

Management decisions regarding the purchase of new equipment are, and rightly so, reflecting an awareness of the fact that there are many areas of operation—other than actual machine design—which affect machining costs.

Machine performance, for instance, is being studied more closely in line with *the job to be done.* The buyer is becoming increasingly more conscious of the need for sales, service and engineering help—*when he needs it.* He is taking a closer look at the machine he is considering, in relation to the advantages of "operator familiarity"—will there be plenty of experienced help available.

Analyzing his problem and evaluating these important considerations, he usually finds *more* of the right answers at National Acme.

National Acme's experience in the design and manufacture of nearly 50,000 multiple-spindle bar and chucking automatics and fully automatic turret lathes provides a background of experience and versatility not to be found in less comprehensive lines of machines. This combination of *the RIGHT machine backed up by experienced and responsible engineering assistance* is hard to beat.

May we talk it over with you?

THE **NATIONAL ACME** COMPANY

189 East 131st Street, Cleveland 8, Ohio

LETTERS

(Concluded from page 10)

this increased demand for engineers is the need for competent engineering secretaries.

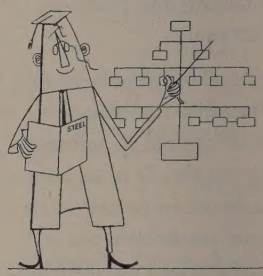
Eleanor Laird
Secretary to Chief Engineer
Industrial Division
Wayne Pump Co.
Ft. Wayne, Ind.

Seminar To Use Selector

We are impressed by your Metal Selector guide (insert in the Oct. 10 issue) and would like 150 copies. We are holding a value analysis seminar in Pittsfield and plan to distribute copies to our students (manufacturing and engineering supervisory personnel).

P. S. Demos
Purchasing Value Analyst
Power Transformer Department
General Electric Co.
Pittsfield, Mass.

Teacher Uses 1955 Series



I have found the 1955 Program for Management series interesting and helpful. I would appreciate a copy of the whole series for my file as I find the articles helpful instructional material.

Paul A. Bierwagen
Instructor in Management
Milwaukee Extension Division
University of Wisconsin
Milwaukee

Essence of Good Editing

Please send me copies of parts I and II of the article, "Atoms Mean Business" (Oct. 31, page 66 and Nov. 7, page 158).

I find your journal extremely useful, and articles of the type requested indicate that you accurately sense the reader interest well in advance—which is the essence of good editing.

Neville S. Spence
Metallurgical Engineer
24 Silvie St.
Deep River, Ont.

Please send two reprints of part I. We have found it informative and thought provoking.

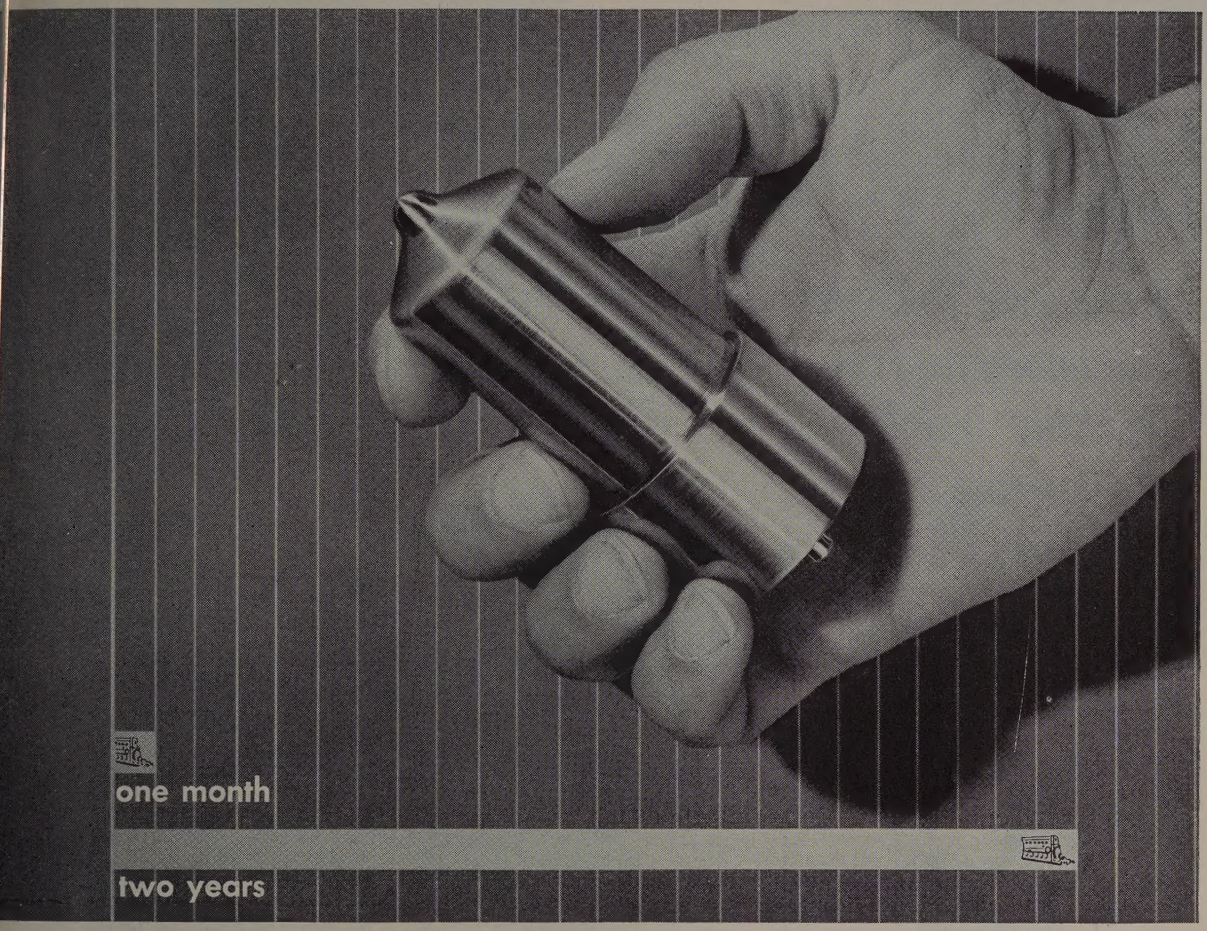
M. H. Pryor Jr.
General Manager
Monroe Tool & Mfg. Co.
Monroe, Mich.

Apparatus Analyzes Metals

We would be interested in more information on the Spectromet mentioned in the Technical Outlook column of Oct. 31 (page 65) in the item, "Fast Analysis." Could you tell us to whom we can write for more details?

J. A. Cameron
Chief Metallurgist
Elliott Co., Inc.
Jeannette, Pa.

• *The Spectromet is manufactured by Baird Associates Inc., 33 University St., Cambridge 38, Mass. Winslow Davies is sales promotion manager.*



IOW FAR CAN YOU GO

in multiplying service life of critical parts?

Tips were breaking off these fuel injector nozzles for esel engines within one to 30 days after installation. esult: costly damage to the engines. The nozzle manu- cturer was on the spot. He needed a tougher steel . . . id one with greater hardening accuracy because the oles in the nozzle had to be held extremely small.

At this point the company called in Carpenter . . . id a Carpenter-engineered specialty steel was matched the job. Service life of the nozzles promptly increased om 30 days to an average of two years. And shop fabri- ting problems literally disappeared.

Every week, more companies like yours are discover- g just how far they can go in increasing service life of itical parts . . . reducing fabricating headaches . . . iproving product salability. Here's one reason why: arpenter quality and pioneering ability are backed by one of the largest staffs of skilled metallurgists, per pound of steel produced, in the industry.

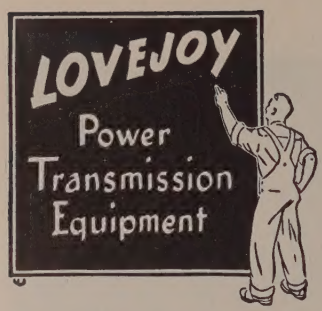
Can you honestly afford to remain "satisfied" when this road to improvement lies wide open? Start by sending for a copy of "A Guide to Specialty Steels as Made by Carpenter." *The Carpenter Steel Co., 139 W. Bern St., Reading, Pa.*

Are you taking advantage of these specially-engineered steels as made by Carpenter?

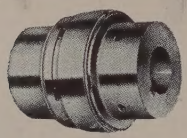
Matched Tool and Die Steels / Stainless Steels / Special Purpose Alloy Steels / Silicon and High Nickel Alloys / Valve, Heat-Resisting and Super Alloy Steels / Tubing and Pipe / Fine Wire Specialties

Carpenter STEEL

for product improvement

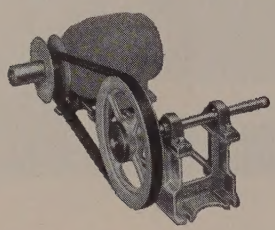


• Economical In Cost
• Maintenance-Free
• Easily Installed



Flexible Couplings:

No lubrication required. Quickly installed. Easily replaced. Cushions are reversible—can be changed or reversed without shutdown. Fractional to over 2400 hp. Light, medium or heavy duty.



Variable Speed Pulleys:

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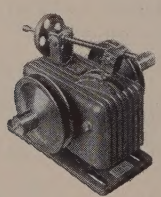

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CALENDAR
OF MEETINGS

Nov. 28-Dec. 1, Air Conditioning & Refrigeration Exposition: Atlantic City Auditorium, Atlantic City, N. J. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Dec. 5-9, National Exposition of Chemical Industries: Commercial Museum and Convention Hall, Philadelphia. Information: International Exposition Co., 480 Lexington Ave., New York 17, N. Y. Manager: E. K. Stevens.

Dec. 7-9, American Institute of Mining & Metallurgical Engineers: Electric furnace steel conference, William Penn hotel, Pittsburgh. Institute's address: 29 W, 39th St., New York, N. Y. Secretary: E. H. Robie.

Dec. 7-9, National Association of Manufacturers: Annual meeting and exhibit, Waldorf Astoria, New York. Association's address: 2 E. 48th St., New York, N. Y. Secretary: Noel Sargent.

Dec. 12-13, Material Handling Institute Inc.: Annual meeting, Hotel Statler, New York. Institute's address: One Gateway Center, Pittsburgh 22, Pa. Managing director: R. Kennedy Hanson.

Dec. 12-16, Atomic Exposition and Nuclear Engineering & Science Congress: Public Auditorium, Cleveland. Information: International Atomic Exposition, 931 Book Bldg., Detroit 26, Mich.

Dec. 13-15, Industrial Truck Association: Winter meeting. Hotel Statler, New York. Association's address: Washington Loan & Trust Bldg., Washington 4, D. C. Managing director: William Van C. Brandt.

Jan. 3-6, Institute of Scrap Iron & Steel Inc.: Annual meeting and exhibit, Sherman hotel, Chicago. Institute's address: 1729 H St. N. W., Washington 6, D. C. Executive vice president: E. C. Barringer.

Jan. 9-13, Society of Automotive Engineers Inc.: Annual meeting, Sheraton-Cadillac hotel and Hotel Statler, Detroit. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: John A. C. Warner.

Jan. 11-13, Aluminum Extruders Council: Annual meeting, Saxony hotel, Miami Beach, Fla. Council's address: 209 Washington St., Boston, Mass. Executive secretary: Phillip Lemelman.

Jan. 11-14, American Road Builders' Association: Annual convention and exhibit, Municipal Auditorium, Miami Beach, Fla. Association's address: World Center Bldg., Washington 6, D. C. Executive vice president and secretary: Eugene Reybold.

Jan. 18-19, Caster & Floor Truck Manufacturers Association: Annual meeting, New Weston hotel, New York. Association's address: 27 E. Monroe St., Chicago 3, Ill. Secretary: Harry P. Dolan.

Jan. 20, Malleable Founders' Society: Semi-annual meeting, Hotel Cleveland, Cleveland. Society's address: 1800 Union Commerce Bldg., Cleveland 15, O. Secretary: Lowell D. Ryan.

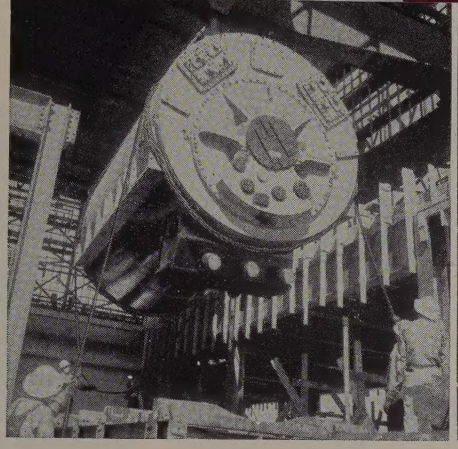
Jan. 23-24, Industrial Heating Equipment Association: Annual meeting, LaSalle hotel, Chicago. Association's address: Associations Bldg., Washington 6, D. C. Executive vice president: Carl L. Ipsen.

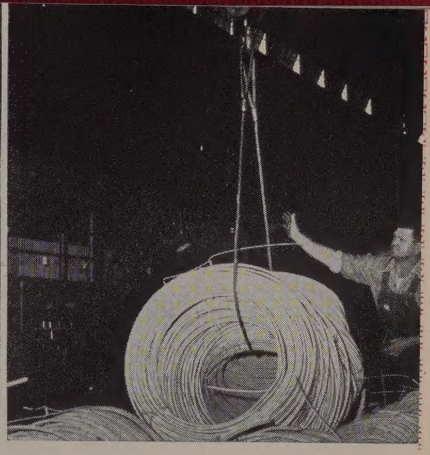
Jan. 23-25, Truck-Trailer Manufacturers Association Inc.: Annual meeting, Edgewater Gulf hotel, Edgewater Park, Miss. Association's address: 710 Albee Bldg., Washington 5, D. C. Managing director: John B. Hulse.

Jan. 23-26, Plant Maintenance & Engineering Show: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Jan. 24-27, American Management Association: General management conference, Fairmont hotel, San Francisco. Association's address: 330 W. 42nd St., New York 36, N. Y. Vice president-secretary: James O. Rice.

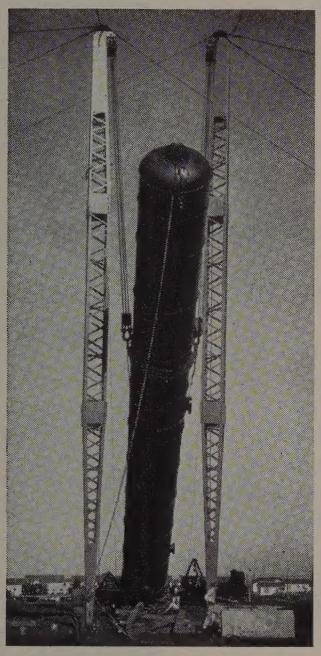
Jan. 26-27, Blast Furnace & Coke Association of the Chicago District: Winter meeting, Del Prado hotel, Chicago. Information: C. W. Bruce, chief engineer, Republic Steel Corp., 11600 S. Burley Ave., Chicago 17, Ill.





Multiple-part Red-Strand Slings handle heaviest loads, and are easy to apply to both the load and the crane hook. User tests in Detroit proved Red-Strand slings withstood unusual abuse, yet maintained higher-than-rated strength. A Gary plant uses Red-Strand single-part slings for many lifting jobs like this. These slings are available with various combinations of end fittings for attaching the sling to rings or lugs.

How to Select the Correct Sling for Your Job



A heavy cylindrical load usually calls for multiple-part Red-Strand Flat-Laced slings. They are strong, flexible and do not slip or abrade.

Start your sling selection by analyzing five factors:

1. The load—its size, weight, shape, finish.
2. Working area, amount of head room.
3. Size and type of crane hook.
4. Angle of sling legs.
5. Location and type of lugs or rings, if any.

From this information your supplier can recommend the sling by type, size and length that is safest, longest lasting and most economical for your job.

Types of Slings

Multiple-part slings are always recommended for heavy duty service, because for equal strength they are far more flexible than single-part slings. They hug the shape of the load easily, present a greater bearing surface to the load, and reduce the possibility of marring surfaces.

Where these factors are not so important, either Red-Strand *single-part slings* or *grommet slings* may be used for economy. Single-part Red-Strand slings are often recommended for lifting lighter weight objects, or those that have fixed attaching rings or lugs. Grommet, or continuous strand Red-Strand slings are ideal for forming hitches of various types without fittings.

When you re-use Pin-Lock thimbles you reduce sling costs by 21%

Extra Savings

Two suggestions will help you save money on slings.

The first is to re-use Pin-Lock thimbles on multiple part slings. These exclusive Leschen Pin-Lock thimbles cut sling costs on an average of 21% because they may be used again and again. They lock into sling loops with pins instead of permanent clamps, permitting re-use, and eliminating constant expense of thimble replacements.

The second suggestion is to use Red-Strand slings because they are made of *higher-than-rated* quality Leschen wire rope that delivers *longer-than-expected* service.

Get a copy of Leschen's *Sling Handbook* for complete information. Ask your Leschen man for one, or write.

Depend on Leschen's higher-than-rated quality for longer-than-expected service.

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Metalworking Outlook

Steel Expansion

U.S. Steel Corp. says reports that it will spend $500 million on expansion in 1956 are "unconfirmed rumors." It has nothing to announce now. Here's the score on current steel plans thus far announced: Republic, 1,618,000 tons; Armco, 1,176,000 tons; National, 1 million tons; Inland, 800,000 tons; J & L, 700,000 tons; Granite City, 360,000 tons; Wheeling, 270,000 tons; Pittsburgh, 211,000 tons; C F & I, 160,000 tons; Northeastern Steel Corp., 112,000 tons; Copperweld Steel Co., 42,000 tons; Roanoke Electric Steel Co., 25,000 tons, Eastern Stainless Steel Corp., 18,000 tons. Total: 6.5 million tons.

Merger Stalemate

Bethlehem Steel Corp. and Youngstown Sheet & Tube Co. are willing to face a court to test their merger plans, provided it's no donnybrook like the Du Pont affair. The companies have been able to receive no assurances of speedy action by the government; that's why they have taken no legal steps toward the marriage. Attorney General Herbert Brownell says prompt federal action will come if and when Bethlehem and Youngstown move.

Growing Market

Among the many growing steel markets over the next two decades will be the oil and gas industries. Austin Cadle, economist for Standard Oil Co. of California, says their demands for steel by 1975 will hit 12 million tons annually. They consumed about 5 million tons in 1954. Much of the increased needs will come from higher well drilling requirements. In 1955 oil and gas industries probably will drill some 55,000 wells in the U.S. By 1975, that will jump to about 81,000.

Unique Hearings

Keep your eye on an important congressional investigation, to start Dec. 5. Rep. Wilbur Mills (Dem., Ark.) heads the Tax Policy Subcommittee of the Congressional Joint Economic Committee that will hold a two-week hearing. Subject: What taxes do to the economy. The hearings—and a 930-page book incorporating ideas of 84 top economists prepared for the affair—are unique: They will attempt to come up with a long-range evaluation of the impact of taxes.

CIO Turns to Illinois

Watch Illinois. The CIO is seeking approval there for integration of public unemployment compensation with the auto companies' Supplemental Unemployment Pay. If an O.K. comes, there's little doubt that the SUP plans negotiated with Ford and General Motors will go into effect as scheduled next June 1. Required is approval of integration by states with two-thirds of each company's employment. Ohio turned down integration in

the Nov. 8 elections, but New Jersey's attorney general approved it a few days later. Other precedents favoring integration have been set in Michigan, New York, Connecticut, Delaware and Massachusetts.

Tool Orders Jump

Machine tool orders in October were the highest for any month since July, 1952. October's new orders, reported by the National Machine Tool Builders' Association, totaled $103.4 million, compared with $61.3 million in September, $65.5 million in August and $64.4 million in July. The industry continues to ship at the rate of $60.6 million a month. Shipments for the first ten months totaled $536,950,000, compared with $778.5 million in the same 1954 period.

More Big Presses?

The Air Force may revive part of the canceled portion of the heavy press program. In the first year of the Eisenhower administration, four forging presses and three extrusion units were dropped because of economy. Some of the extrusion presses may be reinstated—at least a 20,000-ton unit planned for Aluminum Co. of America's Lafayette, Ind., plant where foundations have been partially completed. Reason: The extrusion jobs already built are proving an economic success and have more work than they can handle.

Inflation and Defense

Defense spending is likely to increase in fiscal 1957—because of inflation, not because physical volume will rise. Defense Secretary Charles E. Wilson suggests that the defense budget request should be set in relation to the gross national product. He predicts that about the same percentage of the total budget will go for military hardware as was allowed in fiscal 1956.

Prices Up 15 Per Cent?

Manufacturers' prices will rise a minimum of 15 per cent over the coming seven months, predicts Eliot Janeway, consulting economist. The pressure will come from rising costs of commodities and higher labor wages. He thinks iron and steel scrap will climb to $60 from the present average of $46.33.

Straws in the Wind

The Supreme Court opened this session with 39 labor cases on the docket, compared with 30 the year before . . . French companies will probably supply most of $3.5 million in capital goods for a blooming mill and reversible mill for Acesita, Brazilian manufacturer of special steels . . . The Defense Minerals Exploration Administration approved 17 new exploration projects in October; it continues to receive applications for financial aid at the rate of 40 or more a month.

Restyling the Economy

Keep your eye on the fast-stepping, fast-changing automobile industry. The future of your business could be at stake.

Production of passenger cars in 1955 will be a shade under 8-million units, a new record. Current predictions peg 1956 production at 7-million units. This thinking is shaped by four considerations: The suspicion that the market is momentarily saturated, restrictions on credit, charges from dealers that they are being high pressured and the feeling that potential buyers will pass up 1956 facelifts for all-new 1957s.

But suppose the economy continues to bowl along at a $400-billion clip in 1956; that General Motors and Ford decide to introduce their 1957 lines earlier to meet the competition of Chrysler's more-than-facelifted editions now on the market. As in 1955, auto sales departments in 1956 conceivably could be surprised with another 8-million-car year.

There is evidence of agreement with Chrysler's president, L. L. Colbert, that an 8-million year is no temporary thing: The auto industry is laying out $1.8 billion for new plants and equipment in 1956. Billions more will be spent in the next five years.

These fantastic expenditures will be accompanied by far-reaching changes —and this is where your business, even your job, come into the picture.

As in aviation, the piston engine eventually will be replaced by the gas turbine. Think of the chain reaction that will start! Body and frame construction will give way to single-unit bodies. Transmissions will be subjected to further change and refinement. The small auto dealer, like the corner grocery, may disappear in favor of the auto supermarket in the drive to cut costs.

In this period of accelerated expansion and change, the old will be swept aside for the new. Many a battle for markets in materials, parts and equipment will be lost as well as won.

The important thing is not to get caught by surprise. The auto industry will restyle our economy.

Irwin H. Such

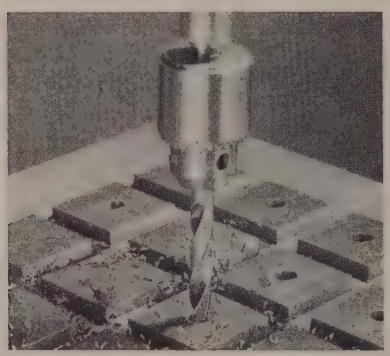
EDITOR

(Advertisement)

WHAT'S NEW
IN STEEL FROM STOCK

Now—Leaded Plates

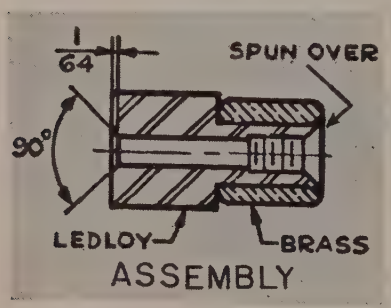
First stocks of leaded steel plates available anywhere are now on hand at Ryerson—and users are reporting results as remarkable as those achieved by thousands of companies with leaded steel bars. Tests show that New E-Z-Cut leaded plates cut faster, take a sounder weld, and polish to a high finish more readily than non-leaded



E-Z-Cut plates. And because sulphur content is much lower New E-Z-Cut is a much cleaner steel, free from troublesome sulphide stringers. First stocks include thicknesses up through 3″.

Leaded Bars Make News

Ledloy from Ryerson attracted a good deal of attention at the Chicago Machine Tool Show this fall when three leading machine tool manufacturers chose this amazingly fast-cutting leaded bar steel to demonstrate the efficiency of their latest equipment. For example, the part shown here was machined from Ledloy and assembled with its brass ferrule at a rate of 200 per hour by one tool builder. And at the A.S.M. Show in Philadelphia machining demonstrations showed that the new Ryerson leaded alloy steel Rycut 40 in-



creases tool life up to 300% over non-leaded alloys in the same carbon range. For more details about these demonstrations, and for many other case studies, call Ryerson—where the nation's largest stocks of leaded carbon and alloy steels are available for immediate shipment.

New Fluid Power Tubing

Another development highlighted at the Machine Tool Show is the tremendous increase in hydraulic power applications. And because of this increase, the new Ryerson stocks of light-wall, pump-cylinder finish cold-drawn WELDED tubing should be of interest to a widening group. The special smooth I.D. of this welded tubing often makes it suitable for use "as-is" in place of more expensive types of tubing which still require extra finishing operations. Also in Ryerson stocks for hydraulic applications: Rockrite cylinder finish tubing and hydraulic fluid line tubing.

New Look for Steel Walls

Give steel-walled buildings new beauty with stainless steel siding in mansard pattern, now available for quick shipment from Ryerson. (Galvanized and carbon steel sheets are also available in mansard pattern.) Unusually attractive, economical in total area lost from pattern formation, maintenance-free stainless in mansard pattern also has many industrial and miscellaneous architectural ornamental applications. For new bulletin 70-5, write Ryerson, Box 8000-A, Chicago 80.

Aircraft Steels Specs

Just off the press, a new booklet entitled "Aircraft Steels" contains latest information, in condensed form, on Aeronautical Specifications—Military (MIL), Air Force-Navy (AN), Federal (QQ-S) and AMS aircraft quality steels. Also included is a complete listing of aircraft quality alloy and stainless steels available for quick shipment from Ryerson. To get your copy write Ryerson, Box 8000-A, Chicago 80, for booklet 93.

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Now available from Ryerson stocks: 96″ wide plates in thicknesses up through 1″, and heavier plates in 80″ widths. Types on hand: 304, 304L, 316, 316L. Save welding on next big job with these larger plates.

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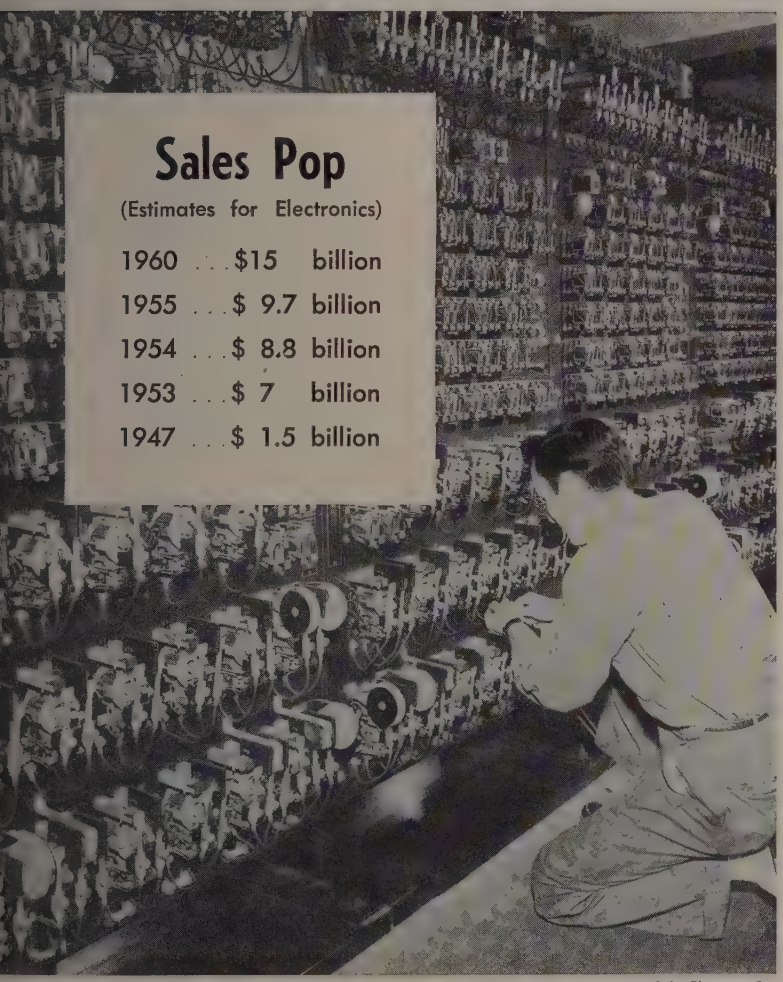


Otis Elevator Co.

iversification, financing and market research cause . . .

Growth Pains in Electronics

ELECTRONIC applications are ecoming as universal as steel itlf—and as unaffected by indusial boundaries as the electric ght bulb," says William G. Laffr, president, Clevite Corp.

Caution—This Cinderella indusy, anticipating sales of $9.7 bilon this year (see table), is still oing through some growing pains. vo major problems: 1. Lack of pital. 2. Inadequate market rearch.

Case History: Consolidated ectrodynamics Corp. (formerly Consolidated Engineering Corp.) has spent some $11 million on expansions and modernizations during the last ten years. Its earnings were about $3.5 million. After paying stockholders and digging up an extra $1 million through depreciation reserves, the company still had $8 million to go. Phillip Fogg, president, reminisces: "I can remember the day, not so many years ago, when I practically crawled on my hands and knees to the bank to borrow another $5000." This is in the past for Consolidated, but many small electronic companies are in the same straits today.

Lesson Learned — The importance of "sell products" is also being realized. Color television has been a rude awakening to many manufacturers. It did not provide a new service—only an added dimension. Few people have been willing to pay the high premium for a color set. On the other hand, as the price can be reduced a ready market is available, say market research surveys. W. R. Baker, vice president, General Electric Co., explains: "There are products in the process of creation which may never become commercial realities because they will cost more than the public can afford."

Soup to Nuts — One definition for electronics: Any device which passes current from a plate to a cathode through a vacuum or gaseous medium. Devices which replace a strictly electronic device (transistors, etc.) are also part of the electronics field. It breaks down in terms of sales into three fields: Communications (radio, television, etc.); industrial (voltage regulators, variable speed devices, etc.); and military (guided missiles, gyros, etc.).

Current military procurement for electronic equipment runs about 6.3 per cent of the total defense spending. Estimates by industry leaders indicate that this will increase to at least 10 per cent by 1965.

Sales Returns—Hewlitt-Packard Co. reports that first half sales for this year jumped 13 per cent over the first half of 1954. Sales outlook for the rest of this year is for a 30 per cent increase over the last half of 1954. "But," explain company officials, "even though the industry is expanding, competition is beginning to be felt and the electronic customer is continually getting more for his dollar."

Most electronic companies are toying with peak years. Motorola Inc. reports that sales during the first half were up 20 per cent over the corresponding period last year. Sylvania Electric Products Inc.

registered a $5-million gain in sales during the first half of this year over the first half of 1954 and explains that the rest of the year should be "excellent."

Point of Interest—Diversification is still the key to success, but some companies are finding that one product could be its bread and butter. Raytheon Mfg. Co. has a widely diversified line of electronic products, but is also placing an increased emphasis on transistors. It is moving into additional plant space which will enable it to triple the present capacity for transistors and other semiconductor devices used in hearing aids, radios, computers, guided missiles, etc.

Diversification is also causing some confusion. Douglas C. Lynch, president, Brush Electronics Co., points out: "The industry pattern is changing so fast that it is difficult to stay current on who is doing what. As the industry's volume expands, it becomes more and more costly to change product emphasis or break into a new part of the field. Because of this, everyone is trying to get on the right horses as soon as possible."

Future — Electronics will not only serve the military and civilian markets in the future, but may well serve the housewife. Possibilities include electronic refrigerators, dish washers, laundries and dust eliminators. Electronics could also be used used to tie together radio-frequency cooking. Air conditioners may be built without motors, compressors or blowers—but with controls which will make it possible to separate humidity from cooling.

Designers say that some of these things could be made now, but the electronic industry is being careful. Reason: There is no need to create new goods or services unless the products can be turned into thousands of sales.

Metal Product Firm Expands

Miller Metal Products Inc., Baltimore, is erecting a 10,000-sq-ft addition to its plant, raising the total to 90,000 sq ft. The added space will be used to produce a new type metal kitchen cabinet. M. M. Miller is president and general manager.

Defense Against A-Bombing

Dispersion of industry is basic to maintaining output in atom war. But, say Armour scientists, individual plants can tal some defensive steps

FIVE atomic bombs could destroy 60 per cent of our electronic instrument capacity.

That's the unnerving prospect tendered by Dr. Robert L. Janes of the Armour Research Foundation, Chicago. Speaking before a recent A-Bomb and industry conference, he declared:

Vulnerable—"The destruction of ten metropolitan areas, selected to maximize industrial damage, could eliminate 50 per cent of our petroleum production, 46 per cent of fabricated metal products and 55 per cent of our electrical machinery productive capacity.

"On the basis of total industrial production, more than 30 per cent emanates from five industrial centers, which house more than 20 per cent of the population."

Dispersion of industry, says Dr. Janes, is basic. Meanwhile, he suggests, plans should be made for both alternative production sources and alternative management.

Getting the Answers—Dr. E. H. Schulz, Armour's assistant director, says industry needs answers for these questions: What are the pressure, radiation and thermal effects of the bomb? What should be done to protect critical structures and equipment? Dr. Schulz calls for declassification of the first question, better information on the second.

The nation has only a "handful" of blast-effect scientists, he points out. Rather than waste their efforts on individual companies, he suggests they should select one plant to be used as a model within every target industry. With a little tailoring, individual companies could apply results at much lower cost.

Suggestions—Raymond S. Sauer, supervisor of Armour's structural analysis section, adds that for the individual plant, the first consideration is to determine whether it is likely to be in a target area. From there, management can study plant operations, construction and facilities to turn up the vulnaral points. One suggestion for vuln able equipment: Take it und ground.

Titanium Fabricator Expandin

Eaton Mfg. Co., Cleveland, pla a major equipment and tooling pr gram at its Aircraft Division Battle Creek, Mich., for the pr duction of titanium compress blades for jet engines. About million will be spent for capi equipment and new tools. T program includes an increase about 10 per cent in floor spa Titanium blades will be produc by Eaton's roll forging process.

The firm's Valve Division h spent over $2.5 million on new f cilities and equipment in the la three years and is contemplati further sizable capital expenditur in the next three years.

Panel Discusses Mergers

Facets of industrial mergers w be discussed by a panel at an ope house session of the 1955 Institu for Small Manufacturers at t University of Pittsburgh on No 29. Viewpoints of an editor, lawy and industrialist will be given.

On the panel will be William Rooney, market editor, STEE Ralph Demmler, attorney, a former administrator of the Secu ities & Exchange Commission; a A. C. Daugherty, manager of ma ket research, Rockwell Mfg. C Pittsburgh, and vice preside Pittsburgh chapter, American Ma keting Association.

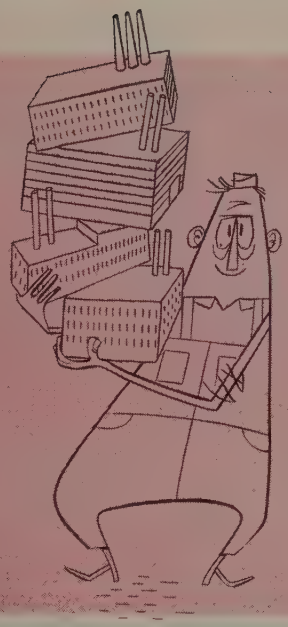
Fastener Manufacturers Merg

Pheoll Mfg. Co., Chicago, mak of screws, nuts, bolts and spec fasteners, purchased Voi-Sh Mfg. Co. Inc., Culver City, Cal Voi-Shan makes precision faste ers for the aircraft industry a will be operated as a subsidiary.

Automotive Expansion

(What the industry is spending exclusive of new model tooling costs)

*1956	$1800	million
*1955	1250	"
*1954	1295	"
1953	956	"
1952	896	"
1951	851	"
1950	510	"
1949	349	"
1948	474	"



*Estimated by STEEL
Other source: Department of Commerce

Autos: Growing Like '60

N 1929, the best prewar auto production year, 4.4 million passenger rs were manufactured. As rently as 1948, two years after the d of the war, only 3.9 million ere produced.

Look at 1955. Production is already past the 7 million mark (an l-time record) and is headed for ose to 8 million by year end. here are many in the industry ho figure 10 million passenger rs could be turned out if the ressure were really on.

Good Growth?—The question is ised: When does growth get out hand? In the face of the unrecedented production and productive capacity, automakers continue to pour forth a steadily increasing stream of modernization d expansion projects. Automakrs are not merely continuing to pand. They are increasing their te of expansion.

Take Chrysler Corp., for example. In the ten years from Jan. 1946, to Jan. 1, 1956, it will ve spent about $750 million for e expansion and modernization facilities. But Chrysler's Presint L. L. Colbert announces $1 llion will be spent *not* in the next n years, which would be a one-ird increase, but in the next five —more than double the existing rate.

Cases — Similarly, Ford Motor Co., which has spent $1.65 billion during approximately the same period, will increase its rate of expansion and modernization. Already announced is a program to spend $1 billion during the next three years, half in 1956 and the remainder in 1957-58. Some observers expect that when 1959 rolls around that Ford will have bettered its figures of the last ten years by a considerable margin. And that's independent of another $1 billion committed for new tooling, which means that by the end of 1957, Ford will have spent or committed more than $3.75 billion since 1946 on new tools and new, expanded and modernized manufacturing and assembly facilities.

Then there's General Motors Corp., producer of about half the nation's passenger cars annually. It has spent about $4 billion for expansion and modernization. GM spokesmen aren't talking about forward planning but it's safe to assume Harlow H. Curtice, GM president, will announce a representative expansion figure in January.

Also High — American Motors Corp., scoring Nash and Hudson separately prior to the merger, has invested more than $175 million in facilities development since the war. Studebaker - Packard has chalked up $100 million in three years under James J. Nance leadership.

Too Conservative — Ernest R. Breech, chairman of the board at Ford, says Ford made a "whopping big bet on the future" because of its belief that "a great many people, including businessmen, may have failed to gage accurately the tremendous changes that have been taking place in our American economy, and are underestimating the potential that lies ahead of us."

He reports that the dream "we have all been anticipating for the early 1960s is no longer a distant dream," and that "we have no choice but to prepare for a major breakthrough onto a new and much higher plateau of production and consumption."

Three Cars—Mr. Colbert says: In 1975 the one-car family will be in the minority. In fact, a large number of families will be using three or more cars. He notes that 14 million families still do not own an automobile, and that two out of every three women have not learned to drive. Close to 6 million cars on the road were built before World War II. In the years ahead, Mr. Colbert estimates 4 to 5 million must be built just to replace those that are being scrapped.

With those factors in view, he does not see the 8-million-car year of 1955 as "a temporary phenomenon."

Where—Where will the money go? Into just about every facet of auto production. New assembly plants and improvement of existing facilities, more and improved engine plants, new and revised body facilities, more plants to make transmissions and, of course, office and research facilities.

Much equipment will be automatic. Mr. Colbert views this as "a timely blessing indeed." While population will increase by 20 per cent in the next ten years, the available work force will increase only 6 per cent.

Aluminum use may more than double by 1960, so . . .

Aluminum Shortage Until '57

LOOK FOR aluminum to be tight through 1956, maybe into 1957. That's the picture painted by top officials of the four big producers (Alcoa, Reynolds, Kaiser and Alcan).

Stockpile calls will be the big key to just how hard to get the metal will be, the executives told Aluminum Extruders Council. Stockpile shipments for the first half of next year already have been deferred by Defense Mobilizer Arthur S. Flemming.

Stockpile Key—"But," says Don Wilmot, vice president, Aluminum Co. of America, "indications are that stockpile requirements have not been realized. We hope they will be deferred for the remainder of next year, but I wouldn't try to predict what will happen."

In addition to its effect on supply, the stockpile has been a deterrent to expansion, points out David P. Reynolds, vice president, Reynolds Metals Co. It worries potential lenders.

Possibility—Conceivably, aluminum supply could be tight well beyond next year. The industry may have fluctuations (of looseness and tightness similar to 1954-55) through 1960, states D. C. Rhoades, vice president and general manager of Kaiser Aluminum & Chemical Corp.

Producers have been figuring that supply will increase about 11.6 per cent yearly through 1960. Between 1954 and this year, use was up 25 per cent. If the annual increase (in consumption) continues at more than the 11.6 per cent, supply will be tight all the way to 1960, in the opinion of Charles R. Nash, vice president, Aluminium Ltd. Sales Inc. As long as use follows the 11.6-per-cent increase, he sees a fairly close balance in supply and demand if there are no stockpile calls.

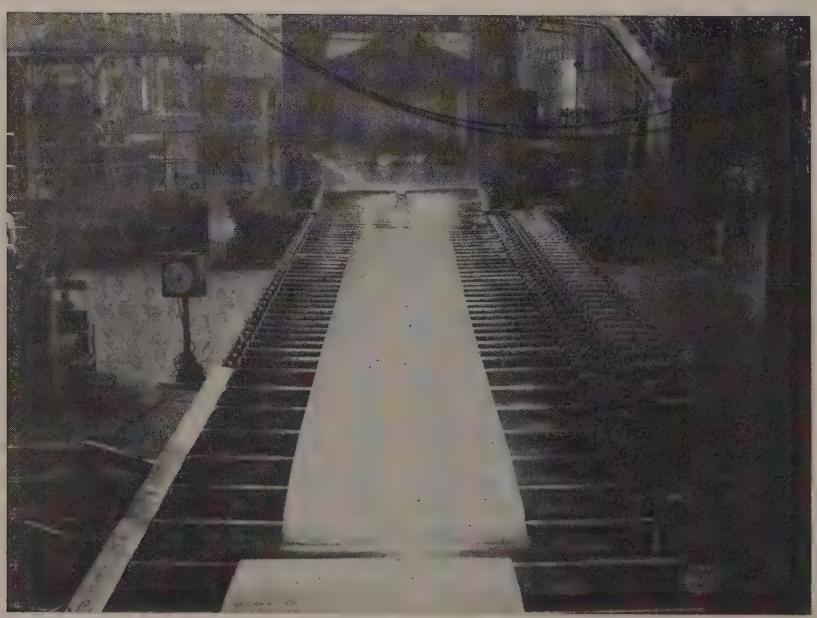
Consumption Up—As things are figured now, about 6 billion lb of aluminum will be used in 1960 (including military, but not stockpile needs). That's one and one-half times present volume. Domestic primary aluminum production will account for about two-thirds of that metal used this ye (remainder is scrap and import Proposed new facilities coming i to production through 1960 w enable primary to hold that pe centage of the supply.

Nonintegrated aluminum use are promised a share of that e pansion. But they're still liable be pinched for metal, especial those which are growing fast than the average.

What's going to happen wh fast tax write-off contracts b tween primary producers and t government run out? Contrac now require shipment to noni tegrated users of two-thirds output from fast tax write-off f cilities. Over the next couple years the contracts call for th amount to be cut back to 25 p cent for the next 15 years. Pr ducers say it won't make any d ference in the amount of met available to independent user more is being shipped now th the two-thirds the contracts r quire.

Hunt for Markets — Produce see plenty of room for continu growth. And in spite of the tigh ness of supply, they're keeping the search for additional uses a markets. Rapid growth is foreca for sheets, extrusions (see opposi page), rod, bar and wire, diecas ing and permanent mold castin

Most favorable industries f further big gains are building a construction, autos, canning a packaging, electrical, farm irrig tion and oil. The big invasion aluminum into the auto industry looked for in 1957 and 1958 mo els.

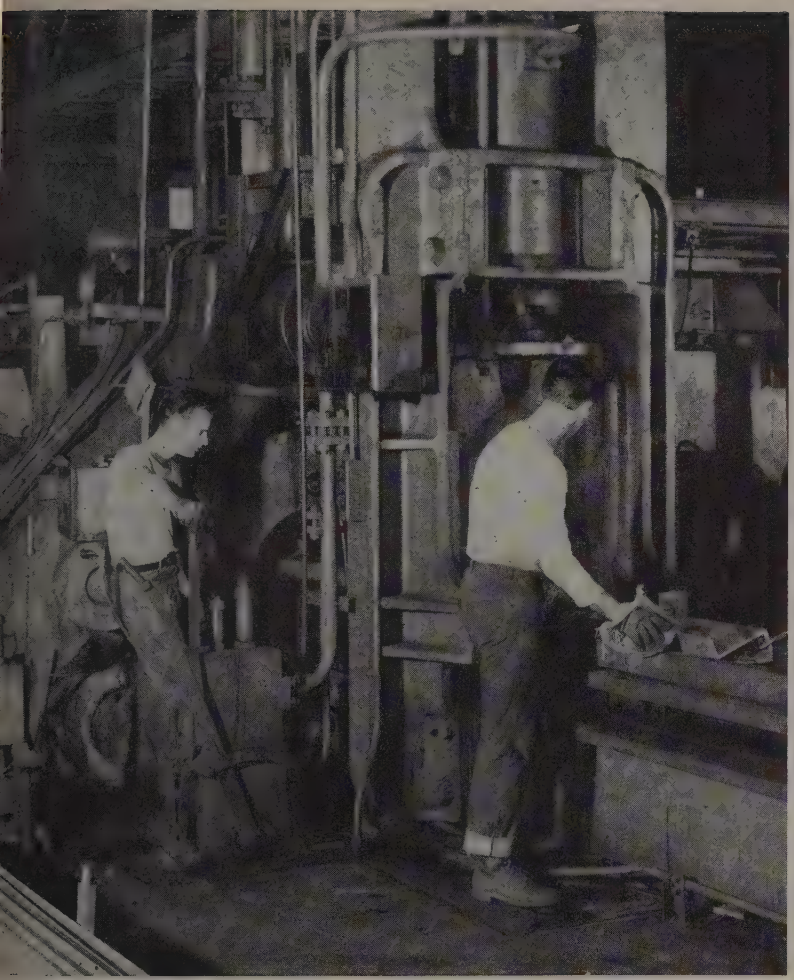


These aluminum slabs are on Kaiser's hotline for rolling into sheet

Kennametal Buys Almond Mfg

Kennametal Inc., Latrobe, P purchased T. R. Almond Mfg. C Willoughby, O., primarily to pr vide additional facilities for t manufacture of mechanically he types of metal-cutting tools. T Ohio plant is being equipped f the new manufacturing operation Mark A. Rollinson is manager the new plant.

Kennametal makes cement hard carbide compositions, too and wear-resistant component par for machines and processing equi ment.



Harvey Machine Co. Inc.

Skyrocketing aluminum consumption may mean . . .

Extruders Feel Metal Pinch

ALUMINUM EXTRUSIONS are going places. Nonintegrated extruders will do about a $250-million business this year, and figure to grow about 20 per cent a year for the next five—if they can get enough metal (see opposite page).

Says Philip Lemelman, executive secretary, Aluminum Extruders Council: The industry will use 600 million lb of aluminum in 1955, compared with 100 million in 1949. Use may hit 1.35 billion lb by 1960.

Big User — Independent producers have taken about 20 to 25 per cent of primary aluminum production for the last several years.

Most independent extruders — there are about 100 of them, compared with about 6 ten years ago—got into the business to supply extrusions for their own end products, says Jack Doering of J. S. Thorne Co., Philadelphia. Now many also produce extrusions for sale.

Squeeze—Big uses of extrusions are in building trim, windows and doors, truck trailers and TV antennas. Opportunities for expansion are great in autos and furniture.

Extruders agree that business is fine as far as finding customers goes. Then comes the squeeze—they can't get enough metal. The situation might be even tighter, but window and door makers—big users—are fighting a glass shortage as well, which cuts down on their intake of metal.

Shut Down—"We aren't starving to death," says one executive, "but we all could use more metal than we're getting." Another adds: "Sales are no problem, but I've had to shut down one of my three presses."

In best shape are extruders that have been in business for some time.

Scrap Tight—With the price of aluminum scrap higher than the cost of primary metal billets and a conversion cost of 3 to 5½-cents a pound added in, it makes the going rough at times for firms that have to depend on secondary metal to keep operating. Also, clean scrap is almost as hard to find as primary metal.

Youngstown is one of few areas in the country where large amounts of aluminum scrap are generated. So times are busy for firms like Superior Industries Inc. About 2 million lb of scrap per month are converted there. The company uses about 20 per cent of that in its own presses, sells the rest, says S. J. Henry, president.

Sidelines—Extruders are never just sure where new business is going to pop up. "Our main business is television antennas," says Harry Resnick, president, Channel Master Corp., Ellenville, N. Y. "But we're supplying increasing amounts of drawn aluminum tubing to the furniture industry." It's estimated that the television antenna industry takes about 16 million lb of aluminum annually, about half of which ends up in the furniture business.

In Boston, Trim Alloys Inc. does most of its business in interior building trim, but is finding a growing sideline in producing dies for other extruders, says M. J. Smith, president.

Likely to add additional pinch to aluminum supply are the numbers of new extrusion presses being ordered. About 60 will be installed this year. Press builders estimate another 60 will be put in next year.

Somewhat of a mystery to other extruders—and perhaps even to the press buyers themselves: "Where is the metal to operate them going to come from?"

Lindberg draw furnace anneals torsion bars at National Acme Co., Cleveland

Savings in Heating

WHY BUY a new Whizzer V-8 when it costs the same amount of dough to get the old Clunker 6 repaired?

Silly question? Yes—whether you are talking about the family jalopy or your firm's industrial furnaces. But that doesn't mean it isn't being done.

For Example — The Industrial Heating Equipment Association Inc., Washington, says one of its members overhauled two protective atmosphere generators over 30 years old. Two new generators (and improved performance) could have been bought for what it cost to have the oldsters repaired.

Why repair? The men negotiating the deal explained that their company had money in the budget for maintenance but none for capital expenditures.

Obsolescence—A conservative estimate places the amount of obsolete heating equipment in use at 35 per cent. The result is waste —unnecessary grinding, machining and descaling.

The association says any industrial furnace more than 20 years old must be considered obsolete.

Sales—A lot of industry agrees and is buying—orders of industrial heating equipment through October were nearly $71 million, compared with $46.3 million for all last year. In 1953, sales were almost $68 million; in 1952, near $76 million.

Induction heating orders continue at a driving pace. September's orders were $1.1 million. Orders for the year are about 1 per cent of last year's.

Case Histories—Behind the ri in equipment sales are savings time and money. When Ingers Milling Machine Co., Rockford, I replaced three batch-type, hig speed furnaces with one pushe type atmosphere furnace, it boos ed production 53 per cent and c grinding time in half.

By heat treating high-speed cu ter blades in the controlled atmo phere furnace, scale was elimina ed, and the blades could be m chined before heat treating. Grin ing time was reduced and sa blasting eliminated.

New machinery at Kearney Trecker Corp., Milwaukee, dropp the cost of hardening a sadd clamp eccentric from $1.57 to le than a dime.

Costly straightening and clea ing were eliminated, and he treating costs were slashed to on seventh of what they were. T new process enabled a switch be made in steel specificatio Savings: 11 cents on each pie

More Improvements—A box-ty heat treating unit solved a distor tion problem for Geo. D. Rop Corp., Rockford, Ill.

The old method of heat treati large, rotary pump gears distort trunnions considerably. Additio al machining and grinding we needed, and the gears were l soft near the hub.

Now, an automatically co trolled atmosphere unit holds d tortion within 0.004-in. run-o Less trunnion stock is needed, a grinding time is saved.

With the endothermic furna atmosphere, the gears stay brig and free of scale. Blasting a pickling are eliminated. It's eas and takes less time for inspecto to find surface defects when the is no scale. The center hole, whi formerly had to be cleaned in separate operation, now needs on washing before assembly.

Still More—At Charles L. Jar

o., North Attleboro, Mass., solid
nd fluted tap blanks made of mo-
bdenum high-speed steel are
rdened—completely free from
ecarburization.

Several operations usually need-
in making taps are eliminated.
battery of small, batch-type
ectric furnaces (designed for high temperature heat treating of air hardening alloys and high-speed steel) consistently gives a desirable hardening quality.

The accurate control of temperature and protective atmosphere by modern equipment has made rejections due to improper hardening negligible.

urvey shows demand shifts as . . .

Western Steel Needs Rise

ESTERN STEEL markets prob-
ly will demand more steel in
56 than ever before as users
fill depleted inventories.

Survey of 1955 — Kaiser Steel
rp., Oakland, Calif., in its an-
al summary of the western steel
arket reports: "Steel mill prod-
ts in 1955 should approximate
2 million tons in the seven west-
n states." This compares with
1 million tons in 1953's high year.
Kaiser continues: "This 1955
arket is particularly impressive
ce practically all receipts were
nsumed. In 1953, a substantial
rtion of the market demand rep-
sented inventory receipts."

Rundown for 1954—Biggest per-
ntage of the 1954 western mar-
t was tin mill products, which
counted for 18 per cent of the national market. Sheet and strip steel took only 4 per cent. The western market for other product groups was about 10 per cent.

All told, the 1954 demand was down 15 per cent from 1953. Western buyers received 5.2 million tons (9 per cent) of national output.

The Kaiser report states: "It is believed that inventory reduction was a primary reason for this decrease . . . most general economic indicators did not drop so much."

Sources—A little more than one-half of the steel received in several western states comes from local mills. Most of this is structural, plates, bars and bar-size shapes.

"Tubular products, wide flange beams, tin plate and light flat rolled products must be obtained from eastern mills," says the survey. Foreign imports to the Pacific Coast in 1954 were 119,000 tons.

Distribution — Steel consuming areas within the region have definite market characteristics.

Southern California annually accounts for 40 to 45 per cent of the western steel market. It receives about 55 per cent of sheet and strip shipments to the area. Northern California takes about 35 to 40 per cent, much of it in tin plate for canneries.

Oregon and Washington's share of the market is about 15 per cent. Carbon and reinforcing bars predominate in this area because of heavy construction developments.

Arizona, Utah, Nevada and Idaho receive about 7 per cent of total western steel shipments. Sheet and strip steel isn't so important here—there is less metalworking, more heavy construction for power and mining projects.

Market Trends — The Kaiser study reveals significant changes in the importance of major product groups over the last few years.

"Plates, structural shapes and bars have constituted an important part of the western market as resources and industry developed. However, these products which accounted for 45 per cent of the market in 1951, declined to 38 per cent in 1954," says the report.

Sheets and strip have increased as more emphasis is placed on manufacturing and consumer goods and industrial equipment. Standard and line pipe holds relatively steady.

Western Market for Steel Products

From 1951-1954

	1954 Net Tons	%	1953 Net Tons	%	1952 Net Tons	%	1951 Net Tons	%
OSS TOTAL	5,197,000	100	6,316,000	100	5,415,000	100	6,040,000	100
ODUCT GROUP								
tes, Sheared & U.M.	748,000	14	1,108,000	17	939,000	17	1,155,000	19
ctural Shapes	440,000	9	544,000	9	414,000	8	468,000	8
. Bars & Bar Size Shapes	797,000	15	989,000	16	1,030,000	19	1,088,000	18
ets & Strip	943,000	18	1,126,000	18	869,000	16	925,000	15
ndard & Line Pipe	392,000	8	530,000	8	475,000	9	453,000	8
Mill Products	894,000	17	895,000	14	867,000	16	876,000	15
Other Mill Products	983,000	19	1,124,000	18	821,000	15	1,075,000	17

Kaiser Assists Indian Project

A $130-million steel plant expansion is going up at Jamshedpur, India.

Kaiser Engineers Division of Henry J. Kaiser Co., Oakland, Calif., has signed an agreement to assist Tata Iron & Steel Co. Ltd., Jamshedpur, with design, procurement and construction.

The job will require purchase of some $50 million worth of machinery and equipment. It is scheduled for completion by May, 1958, and will increase Tata's ingot production from about 1.3 to 2 million long tons annually. The boost to India's total capacity will be near 45 per cent.

Renegotiation Under Fire

It has outlived its use, may be costing the government money, opponents contend. Congress is investigating, will make its report in May

CHANCES are fair that renegotiation of defense contracts will be allowed to die when the present law expires at the end of 1956.

Chief proponent for continuing the law is the Air Force, while the Army and Navy don't seem to care particularly one way or the other. The only reason for continuation, says one outside-the-government executive: "It's a handy way to cover up errors of judgment."

Fair Prices—The U. S. Chamber of Commerce says that the government "already has devised a whole series of pricing techniques which make it virtually impossible for it to pay more than fair prices."

Specifically pointed out is a section of the Armed Forces Procurement regulations under which the services can put renegotiation (they call it price redetermination) clauses right into a contract. The chamber says: With that provision and other devices, there is no need for a second look at prime contract prices by the route of statutory renegotiation.

Profit Control — Objections to the law: Renegotiation has become a profit control device, which has no place in a civilian economy. Because of this profit control, low cost and efficient producers become reluctant to do business with the government; they turn their talents to the civilian market, and the government is forced to depend on less efficient producers.

The net result is a deterioration of the country's preparedness to shift to war production.

Make or Break? — It's doubted by many that the government ever netted any cash through renegotiation. Some who have studied the subject say the government may have lost money on the deal because:

1. More than half the money "recovered" by renegotiation would have gone to the government anyway in the form of taxes.

2. Cost to companies of administering renegotiation is tax deductable.

3. Some efficient companies have been avoiding defense work, so the government pays more for some things it buys.

4. Direct cost to the government of carrying out renegotiation procedures is high.

The Joint Committee on Internal Revenue Taxation is taking Congress' first real look into the situation in several years. A report is due May 31.

ODM Prepares

Office of Defense Mobilization sets up a disaster plan: If defense production or movement is im-

Meet Cal W. Seeley, new director of the Copper Division, Bussiness & Defense Services Administration. Mr. Seeley is on loan to BDSA from Scovill Mfg. Co. After his six-month hitch in the Copper Division, he'll return to his regular job as Scovill's Philadelphia district manager. He can be reached at room 4806, Department of Commerce, Sterling 3-9200, Ext. 4074.

peded, materials under contract the government or materials fr the Defense Production Act inv tory can be released for spec defense projects.

Progress in Shipbuilding

Clarence G. Morse, Fede Maritime Board chairman, sa "We are confidently looking f ward to generating as many as ships a year, minimum, for t next 12 to 15 years. It's a g start from a point back in l 1953 when not a single order h been written for an ocean-goi ship in more than a year.

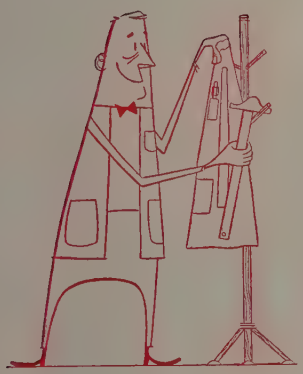
Railroads Get Write-Off

Heavy railroad buying shows in the latest batch of certifica of necessity for fast tax write-o issued by the Office of Defe Mobilization. Of 79 certificates, were for new freight and passeng cars, track, freight yards and si lar railroad improvements. All freight car certificates were issu at an 85-per cent rate.

Some of the other major ce ficates included $12 million metallurgical coal, United Sta Steel Corp., 35 per cent allow $30 million for electric power g erating facilities, Cleveland El tric Illuminating Co., 65 per c allowed.

Here and There

Defense department joins G in setting aside more contracts small business . . . Patent Off is working on ways to speed search procedures by use of el tronic machines . . . Small Bu ness Administration has ma $23.7 million in low interest loa to disaster victims, mostly in Northeast . . . Navy will set two more "Texas Towers" (o shore radar warning and weath collection and reporting statio at a cost of over $16 million. I cations: One about 100 mi southeast of Cape Cod, one ab that same distance southeast New York City. Air Force will erate them.



Crane's Magos: Engineering Executive

"TOO FEW engineers reaching the point of assuming executive duties are prepared for such responsibilities." That's the belief of John P. Magos, director of engineering and research at Crane Co.'s Chicago works.

Active participation in professional societies and keeping pace with technical progress in your field are not enough, he points out. That's only part of executive development.

Help Yourself—The development he's referring to isn't the company sponsored and directed in-plant training program. He's talking about the individual engineer's efforts to broaden his education and understanding of the business world he lives in.

Mr. Magos didn't pick up that philosophy in a textbook either. He's lived it. Starting as a draftsman for Crane in 1923, he enrolled in night school at Armour Institute of Technology to gain a college education. Fifteen years later—five at Armour and the remainder at University of Chicago—he received a hard-earned bachelor of science degree, with majors in physics, chemistry and mathematics. In 1950, he gained another degree via the night school circuit—this time a master of business administration from U of C's executive program.

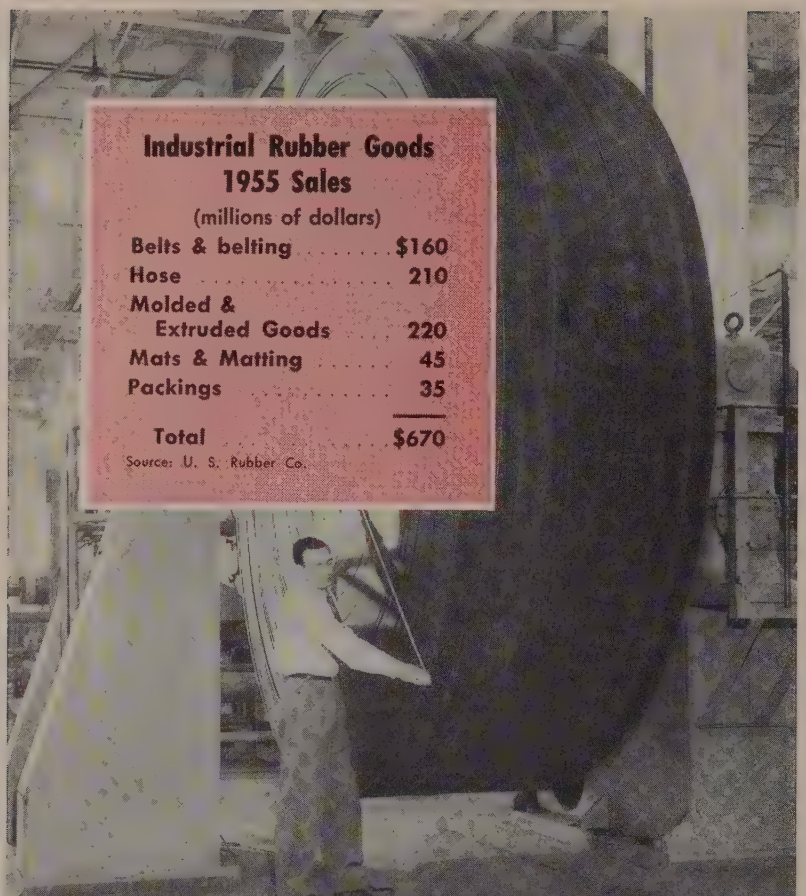
Continuing Education—"During the first few years of practice," Mr. Magos points out, "an engineer's emphasis should be on professional development. At some point, concurrent with further development, he should become aware of the need for broadening his general education—formally or informally—to allow for executive development."

Some of the fields in which Mr. Magos recommends study by the engineer: Accounting, economics, finance, government's role in business, human relations and labor.

Preparation—He's not suggesting that engineers earn degrees in each field. But they can read excellent books or take adult courses to gain basic understanding. With this background, the engineer will be better prepared to accept executive responsibilities and will increase his probability of further success.

Finally, to help round out the engineer's development, he should be ready and willing to participate in such civic affairs as welfare, civil defense, school and youth programs.

All work and no play? That's not Mr. Mago's idea either. For relaxation he likes to read detective novels. He also holds a federal license as a ham—an amateur radio operator.



B. F. Goodrich Co.

Production of belting like this contributes to . . .

Uptrend in Rubber

INDUSTRIAL RUBBER goods sales are stretching out to about $670 million this year.

That's about 12 per cent over 1954. Next year they may go higher, but just how much depends on who's talking. Some of the larger companies say sales will be about the same as this year, possibly 3 or 4 per cent more. Smaller manufacturers claim they look for an 8 to 10 per cent production increase in 1956.

Reason—The Rubber Manufacturers Association, New York, looks for a slight drop in rubber consumption as automobile manufacturers cut back demands for hose and belting between model change-overs.

Some 27 larger companies manufacture most of the hose and belting. The 700 to 800 smaller concerns make mostly molded and extruded goods, plus much of the industrial rubber packing and matting—all of which add up to the $670-million annual sales figure.

Price Peg—Rubber consumption is the peg on which many problems hang. J. F. Joseph, president, Cincinnati Rubber Mfg. Co., Cincinnati, says: "A good rubber plantation can produce 80 to 85 lb of rubber per acre each mon This can be sold profitably at per pound. The current mar price is about 40 to 42c per pou

"Demand exceeds supply," adds. "Smaller companies like o selves find the price pretty hi They buy on a day-to-day ba while the larger companies build up inventories at profita prices." Mr. Joseph feels that s thetic rubber (selling for ab 23c per pound) soon will begin overcome this price problem.

Goodyear Agrees—On the ot side of the fence, President E. Thomas of Goodyear Tire & R ber Co., Akron, says expandi synthetic rubber capacity progress in the development manmade rubber should make more reasonable prices for the n ural product.

"The world is using all the n ural rubber that can be produc as well as all the synthetic," Thomas commented. "Under th tight conditions, the price of n ural has soared way beyond cost of production."

World rubber consumption t year figures to be about 3 milli tons. Two-thirds of this is natu rubber. By 1965, world consun tion may reach 4 million tons.

Plastic Demand — Plastics replacing rubber to some exte especially in irrigation and gard hose, as well as in refrigerator a automotive parts.

Goodyear reports: "The div ing line is melting. Practica everyone in the rubber business also in the plastics field. Cho of product depends on which d the best job at lowest cost."

U. S. Rubber Co., New Yo adds: "With the purchase of s thetic rubber plants by private dustry, we can look for a hea increase in research effort. Th new synthetic rubbers will doubtedly offer the plastics indu try strong competition in the ra for new markets."

Tight Competition—Despite high price of natural rubber, pr lems are minor ones for the indu try. Biggest headache is tig competition. Most selling is throu jobbers and there just are enough to go around. Smal companies often are forced to s directly.

Metalworking finds new paths to profit as . . .

Lubrication Goes Scientific

MAINTENANCE COSTS at an astern steel mill were cut 60 per ent after installation of central-ed lubrication systems. Product uality was improved.

Fidings like this are prompting etalworking to take a longer, ore systematic look at lubricants. he trend has accelerated steadily nce World War II.

New Look—"Steel mill lubrica-on was once an unscientific hand peration. Now it's a specialized ranch of engineering, involving echanics, chemistry and elec-ical instrumentation," comments harles A. Bailey, lubrication en-ineer, National Tube Division, . S. Steel Corp., Pittsburgh.

"Modern machinery would clat-r to a grinding halt if lubricated ith products employed in 1900," xplain officials of The Texas Co., ew York. "Now industry must ave the right lubricant in the ght amount in the right place the right time."

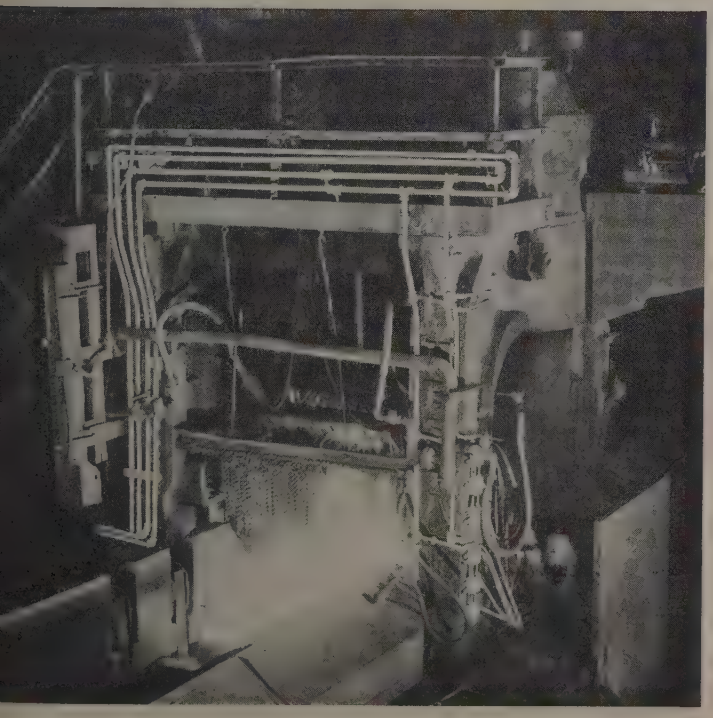
Sales Growth — William P. Youngclaus Jr., administrative secretary, American Society of Lubrication Engineers, Chicago, estimates this year's lubricant volume at close to $200 million. Next year, he adds, should see a further 8-per-cent growth. In 1940, 36.8 million barrels of petroleum lubricants were produced. Use in 1950 was 51.7 million; in 1954, 53.2 million, according to the Bureau of Mines.

In steelmaking, greater loads, closer tolerances and faster mill speeds combine to demand new and versatile lubricants. "Mills no longer function on the cheapest lubricant obtainable," says Richard Fulton, resident engineer, Standard Oil Co. of Ohio, Cleveland. "Lubrication engineers demand quality performance." Add development engineers at Gulf Oil Co., Pittsburgh: "Many mills have lubrication engineers and research departments. Before World War II, there were none."

Looking Ahead — "Centralized lubrication is necessary to maintain the high production that steel mills are turning out," assert officials of Farval Corp., Cleveland. Centralized systems are also gaining popularity in nonferrous mills. Military uses demand other improvements—right now, the Air Force is asking for lubricants that will function over a temperature range from minus 120 to plus 1500° F.

Increased emphasis is being placed on additives, which can boost lubricant performance for many metalworking jobs. Officials of Climax Molybdenum Co., New York, say that sales of molybdenum sulphide, one effective additive, are well above 1954 and should be better in 1956. Lubrizol Corp., Cleveland, does a thriving specialist job in additive research and production.

Trends—The growth of lubricant sales has not been as rapid as the growth of metalworking. Reason: As oils and greases are improved, less are needed for a given application. And in machine design, the accent is on better lubrication rather than sheer lubricant quantity. But lubrication engineers feel they are on their way to winning their biggest battle — making known what they can do for industry. They are confident that they can rely on their own product development to do the rest.



esta blooming mill fitted with Farval centralized lubrication

Wheeling Steel Expands

Wheeling Steel Corp., Wheeling, W. Va., will boost its steelmaking capacity nearly 13 per cent.

Following up the announcement of its $65-million expansion program, Wheeling Steel reports ingot capacity will increase at least 270,000 tons. Present capacity is 2.1 million tons annually.

The company will install two oxygen-blown converter furnaces at its Steubenville, O., works. They will be similar to the furnaces Jones & Laughlin Steel Corp. will put into its Aliquippa, Pa., plant.

Wheeling also plans to increase its output of strip and sheet steel, tin plate and steel pipe. The projects, expected to be completed in the next two or three years, come under the company's long-range construction and improvement program.

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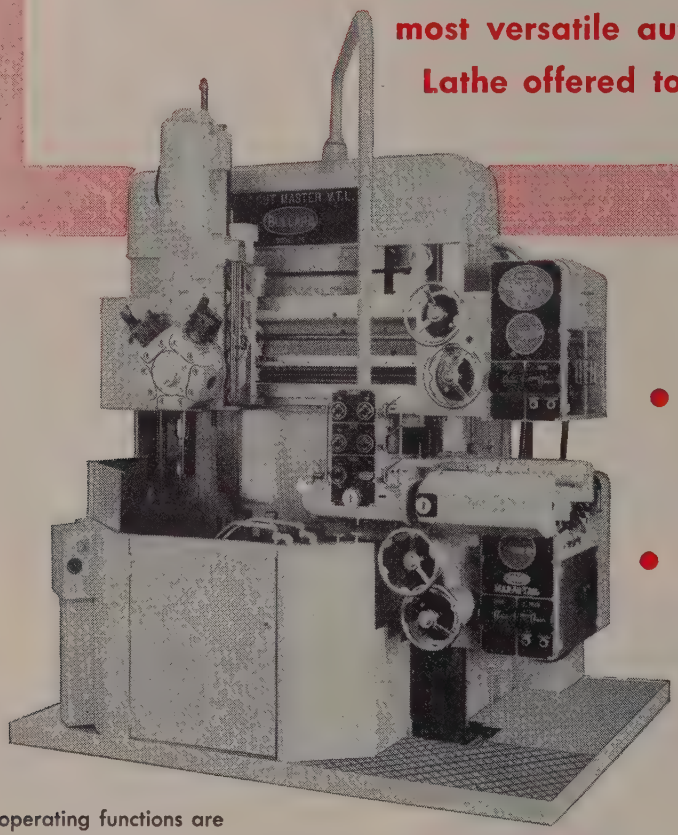

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GM workers assemble blades in an impeller of the coupling added this year on the Hydramatic

Hydramatic Shifts Gears

F YOU'RE looking for an example f where design, engineering and roduction ingenuity are uniquely ombined, check GM's Detroit ransmission Division and its new ydramatic.

In this case "new" carries more ien the usual Motor City validity, nce the redesign is so extensive iat there is no interchangeability f significant components with the rmer version.

The Job—The basic business of ansmissions, in addition to the perations of disengaging the en-ne from the drive shaft and re-ersing shaft rotation, is to change ie torque-speed ratio between the ngine and the rear axle. That an be done electrically, mechan-ally or hydraulically, or by any ombination of the three.

In contrast with Dynaflow, which is purely hydraulic, and Powerglide, which is a hydraulic-mechanical split, Hydramatic has traditionally been predominantly mechanical. Powerflow is divided into about two-thirds mechanical drive and about one-third fluid drive. This was done to give the optimum in performance.

To get this performance, shifting of the planetary gears has been accomplished through simultaneous release and application of brake bands and clutches. But the servo-operated clutch and band transmission, while achieving the performance objective, also required some compromise with smoothness. While this characteristic didn't bother Cad-Allard drivers or the Lincoln team in the Mexican road race, it was noticeable when there was nothing around to beat.

Below Surface—The newness of the new Hydramatic may not be so apparent, since the device retains dual range with four forward gear steps and reverse.

Mechanically, the unit continues such factors as the fluid coupling and three planetary gear sets which have all been modified. But the mechanism has been greatly simplified by the use of one-way sprag clutches and a new fluid coupling which replace the bands and servo-mechanism of the first two planetary gear sets.

Operation—From the operational standpoint that means the second fluid coupling does the job which formerly was done through co-ordination of band and clutch release. Thus, in first gear with the sprag clutch of the front unit on, the shift to second is achieved

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by the fluid coupling filling with oil to take up the drive. In the shift to third, the fluid coupling empties as the rear clutch takes hold—again driving through the front sprag clutch, and the fluid coupling fills once again for the shift into fourth.

The fluid coupling is thus a dump-and-fill-type clutch member, replacing the former front unit clutch. The use of this unit with two sprag clutches replaces the two friction clutches and one of the bands previously used. That leaves only one band which does not require adjustment. Either filling or emptying on each shift, the fluid coupling clutch blends the shifts, but performance is almost unaffected, since the mechanical shifts still take place.

Aluminum—In addition to these changes, a new aluminum bell housing is supplied, and aluminum is also used in the rear bearing retainer. The case is completely redesigned to provide clearance for anticipated lower floor pans, including relocation of the valve body on the bottom of the transmission where it is accessible for service by removal of the oil pan. The rear pump and governor are entirely new, and provision is made for oil cooling. That indicates the design is expected to last for a number of engine and body changes.

New Tooling—Extensive retooling was undertaken for the job, including revision of one final assembly line to pedestal-type conveyors with heads permitting full rotation of the unit during assembly. Production of the former Hydramatic unit is continued for service, certain General Motors divisions and outside customers. The change-over will be gradual. But with retooling still under way, production of 240 transmissions an hour is being maintained, with an increase to over 300 hourly by mid-1956 planned.

Impressive in itself, this figure becomes more remarkable when it is appreciated that Hydramatics are profusely sprinkled with precision parts. Most units for example, contain 23 gears, including ring gears, sun gears, pinion gears, pump gears, speedometer drive gears and starter gears. That adds up to about 1 million gears annually (the division claims industry's gear production championship). With most gears having tolerances measured in tenths of a thousandth of an inch, the average daily output of 151,850 cog wheels is highly impressive.

Mechanization—Within the next few months, it will become even more so. Pinion gear blanks from Detroit Transmission's screw machine department will be washed and loaded into a hopper. From there, automatic handling will take over.

Parts will move through a machine which chamfers the bore faces. Then they will enter a lift and drop down a chute where both hole-shoulder surfaces are ground; next into a zig-zag type of storage unit which has a capacity of perhaps 2000 gears; and then into a machine where both ground faces are lapped and automatically gaged to 0.0002 in. Conveyors then join operations, which include, successively, honing of the hole, hobbing and shaving.

Steps—Run through heat treat in groups, the gears emerge to enter the conveyors once again for grinding of a chamfer on the acute angle side of each helical tooth, grinding of an oil groove in the hole shoulder, vapor blasting remove heat-treating scale, fini honing of the hole and, final burnishing of the tooth surfac

Other examples of materials ha dling changes can be found in m areas of the plant, often tyi standard production machines gether as in the gear departme The intermediate shaft is mov through a sequence of four c terless grinders by a conveyor.

Special—But equally impress are special-purpose installati supplementing or replacing forn setups on multiple-purpose equ ment. A good example is found the new rear-bearing retain Formerly of cast iron, this part ceived rough and finish bores, f turning and grooving on Bullar It was then passed by gravity c veyor to a Sundstrand lathe further semifinish and finish b ing and turning; finally mov to an Ex-Cell-O double-end, fo spindle boring machine for fini ing.

Today, the rear bearing retain are handled on a Sundstr transfer machine of the index pallet type. Loaded into the lets by the operator, they gress through 16 work stati which include washing and g ing the holes, to be ejected at 17th station onto a conveyor. such machine is presently in o ation, and a second is being stalled adjacent to it. They share a common pallet sup

Transfer—Perhaps the high s is the newly installed case tra fer machine which is 390 ft l and includes 250 stations. case castings which weigh 65 on entering this behemoth eme a slim 44 lb, following Green Ex-Cell-O and Ingersoll reduc treatments. About 100 operati are performed in the proc (Handwriting on the wall: equipment is capable of handl aluminum should the need ari

Only two years ago victim one of the most disastrous fire industry's history, the division cently produced its 7 millio Hydramatic transmission. Altho output began in June, 1939, w Hydramatic was introduced, ab one-third of that total was p duced since the fire, and the tr is right on up.

U. S. Auto Output

Passenger Only

	1955	1954
January	659,719	456,765
February	675,769	443,257
March	794,188	526,076
April	754,007	533,470
May	724,891	494,250
June	649,372	504,811
July	659,979	441,451
August	614,392	436,650
September	461,592	285,860
October	517,696†	236,635
November		508,466
December		641,971
Total		5,518,662

Week Ended	1955	1954
Oct. 22	137,425	45,649
Oct. 29	158,430	68,649
Nov. 5	162,278	92,766
Nov. 12	180,754	116,285
Nov. 19	176,996	133,969
Nov. 26	155,700*	111,910

†Preliminary *Estimated by STEEL
Source: *Ward's Automotive Reports*

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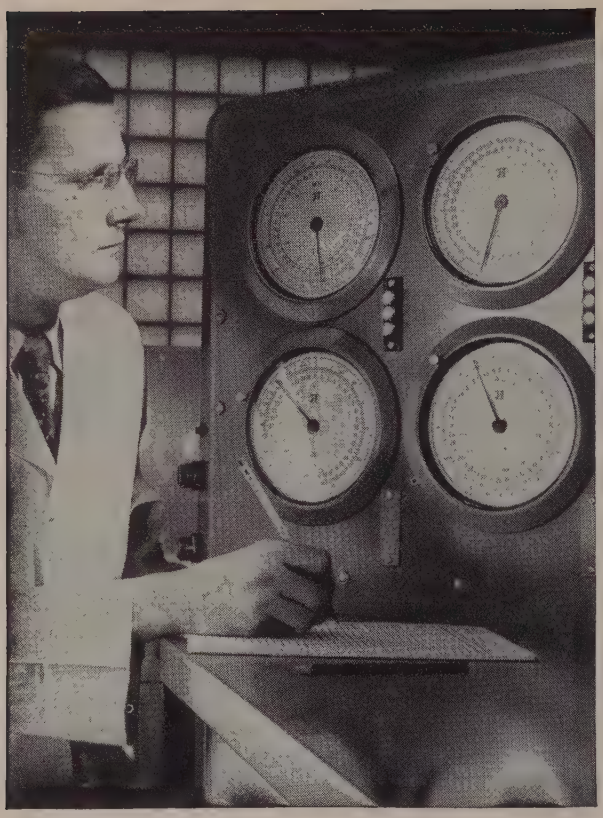

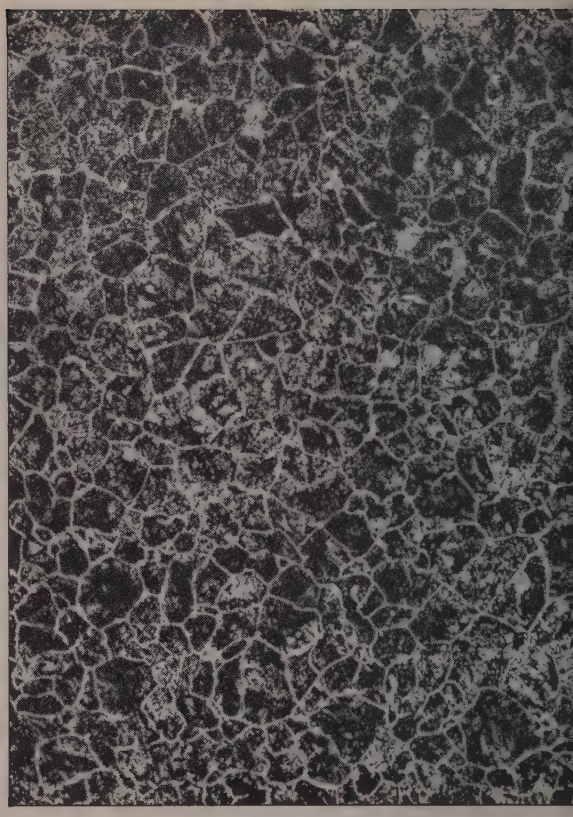

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The photomicrograph at right shows the uniform grain size of the Timken forging steels. Uniform grain size after heat treatment is assured by spectrometric or microscopic examination of every heat. The result—you can be sure that forgings made from Timken forging steels have uniformly high ductility and resistance to impact.

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YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

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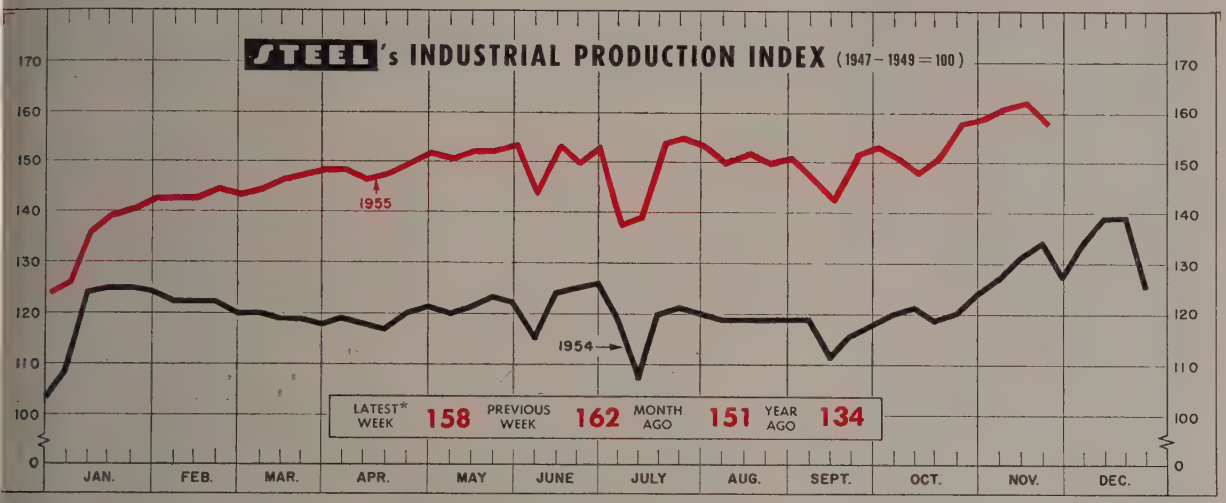

*Week ended Nov. 19. Based upon and weighted as follows: Steel Output, 35%; Electric Power Output, 32%; Freight Car Loadings, 22%; and Auto Assemblies, 11%

Personal, Capital Spending: Record GNP

GROSS NATIONAL PRODUCT is still rising.

Look for it to hit an annual rate of about $395 billion or more in the fourth quarter. For the year, GNP probably will hit close to $387 billion.

Continued Confidence — The country's total output of goods and services (GNP) advanced to a record annual rate of $391.5 billion in the third quarter, some $6.5 billion higher than the second quarter rate. And it hasn't reached its peak. It should continue up through the first quarter of next year and likely into the second half.

Here are a couple of good reasons who GNP will hold high in early 1956:

Money in the Pocket—Personal consumption expenditures for durable and nondurable goods and services have come way up. So has private investment. Both indicate that individuals and companies are making more and spending more—a lot of it for plant expansion and equipment. And they'll have to keep on producing to pay for their purchases.

Personal consumption expenditures rose to an annual rate of $356 billion in the third quarter, $5.5 billion over second quarter rate. In 1954, the annual rate was $236.5 billion.

Dollars To Invest—Fixed private investment rushed along at an annual third quarter rate of $58 billion, $2 billion better than in the preceding quarter. Business outlays indicate it will continue strong well into 1956.

Government spending for national security, often a bolster to a slipping economy, has dropped from a high 1953 annual rate of $51.4 billion to a steady average quarterly rate of $40.7 billion. It probably will hold through this year, but may slip slightly in 1956. In any case, less defense money going out and high tax receipts coming in probably will mean the government can balance its budget in fiscal 1956. That factor is a

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,389[1]	2,394	1,915
Electric Power Distributed (million kw-hr)	10,800[1]	10,878	9,197
Bitum. Coal Output (1000 tons)	9,800	10,100	8,765
Petroleum Production (daily avg—1000 bbl)	6,730[1]	6,809	6,220
Construction Volume (*ENR*—millions)	$401.7	$267.9	$301.8
Auto, Truck Output, U. S., Canada (*Ward's*)	211,632[1]	215,221	160,149
TRADE			
Freight Car Loadings (1000 cars)	710[1]	797	709
Business Failures (Dun & Bradstreet, no.)	200[1]	207	227
Currency in Circulation (millions)[3]	$30,794	$30,657	$30,233
Dept. Store Sales (changes from year ago)[3]	+9%	+1%	−2%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,045	$18,272	$18,925
Federal Gross Debt (billions)	$279,714	$279,751	$278,740
Bond Volume, NYSE (millions)	$17,742	$15,931	$22,777
Stocks Sales, NYSE (thousands of shares)	12,430	9,351	16,791
Loans and Investments (billions)[4]	$85,259	$85,623	$84,424
U. S. Govt. Obligations Held (billions)[4]	$30,300	$30,599	$37,377
PRICES			
STEEL's Finished Steel Price Index[5]	208.90	208.90	194.53
STEEL's Nonferrous Metal Price Index[6]	265.1	264.0	218.3
All Commodities[7]	111.1	111.2	109.5
Commodities Other than Farm & Foods[7]	119.1	119.1	114.5

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1955, 2,413,278; 1954, 2,384,549. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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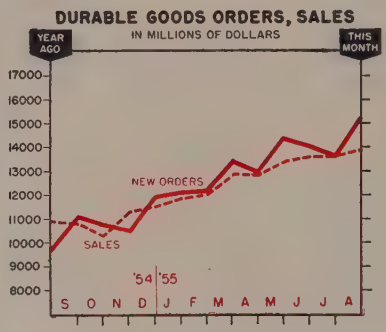
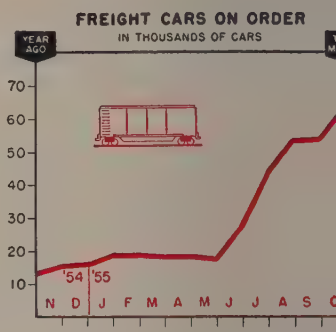


	New Orders*		Sales*	
	1955	1954	1955	1954
Jan.	12,142	9,376	11,850	11,381
Feb.	12,170	9,394	12,029	11,248
Mar.	13,353	9,585	12,860	11,303
Apr.	12,879	9,619	12,805	11,160
May	14,331	9,588	13,322	11,066
June	14,033	9,822	13,527	11,293
July	13,571	9,407	13,503	11,153
Aug.	15,219	9,756	13,852	10,907
Sept.	.....	11,153	.....	10,832
Oct.	.....	10,790	.....	10,295
Nov.	.....	10,491	.....	11,314
Dec.	.....	11,963	.....	11,570

*Seasonally adjusted. U. S. Office of Business Economics



	Awards		Backlogs (end of month)	
	1955	1954	1955	1954
Jan.	5,087	2,942	18,395	27,9
Feb.	2,690	2,057	18,633	25,4
Mar.	2,156	348	17,974	20,9
Apr.	2,706	909	17,930	17,8
May	3,041	1,071	16,886	15,6
June	13,365	1,139	27,102	13,8
July	18,007	883	42,888	12,8
Aug.	13,405	2,425	52,803	13,0
Sept.	3,228	2,396	52,913	11,9
Oct.	12,843	2,704	61,954	12,8
Nov.	.....	3,754	.....	14,8
Dec.	.....	2,685	.....	15,3
Total	.....	23,313		

American Railway Car Institute

Charts copyrighted, 1955, STEEL

good strong business stabilizer.

Good Year Ahead—So it looks like high fourth and first quarters. Even inventories, the soft spot in 1953, are doing their part. They may continue to climb, but it won't be a source of trouble (See STEEL, Nov. 21, p. 65).

Forecasters Cite Claims

The Committee of Technical Consultants, Business Advisory Council, has told Sinclair Weeks, Commerce secretary: "1956 will show a higher rate of activity than 1955."

Just how high is still a bone of contention. William F. Butler, economist for Chase Manhattan Bank, New York, told a meeting of forecasting economists at the University of Michigan, Ann Arbor: "Automobile sales might drop 10 per cent; so might residential construction. But capital expenditures by businessmen on new plant and equipment should rise more than 10 per cent." He looks for a 1956 GNP rate of $400 billion.

V. Lewis Bassie, onetime Commerce department economist and currently director of the Bureau of Economic and Business Research at the University of Illinois, disagrees with Mr. Butler's claims.

Mr. Bassie argues that the U. is top heavy with prosperity. "Bu nessmen construct new plants the basis of projected sales," Bassie explains. "These proj tions are superheightened by timism."

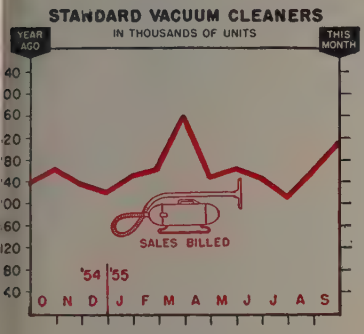
What would precipitate a dow turn? Mr. Bassie believes auto p duction is the key. A down tre in car production can lead the w into a recession, he says.

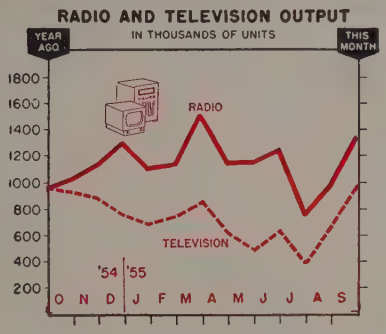
Income Keeps Coming In . . .

Personal income currently is an annual rate above $300 bill (it was $307.5 billion in Septe ber), according to the Comme department. Earnings of manuf turing workers are the pacesett Weekly wages (September) av age $77.90, almost $10 above weekly average for 1952.

A pretty good idea of the w things are going is indicated b statement from the Material H dling Institute Inc., Pittsbur "Bookings for fourth quarter expected to continue high in with the current sharp upw movement of outlays for new pla and equipment."

Orders for the first nine mon already equal 90 per cent of t 1954 bookings. Chances are the





	Sales Billed—Units		
	1955	1954	1953
Jan.	250,123	221,233	255,886
Feb.	262,651	199,035	246,007
Mar.	358,179	276,464	329,294
Apr.	244,143	220,849	268,548
May	261,238	200,434	252,404
June	241,665	195,781	197,506
July	207,758	193,607	159,446
Aug.	255,540	185,397	188,536
Sept.	308,345	238,235	227,253
Oct.	.....	263,197	249,383
Nov.	.....	237,882	216,227
Dec.	.....	217,022	190,773
Total	.....	2,658,136	2,781,263

Vacuum Cleaner Mfrs. Assn.

	Radio		Television	
	1955	1954	1955	1954
Jan.	1,068	872	655	421
Feb.	1,090	769	703	427
Mar.	1,482	940	831	600
Apr.	1,100	745	583	458
May	1,114	722	467	396
June	1,205	838	590	544
July	718	438	344	307
Aug.	948	785	648	633
Sept. ...	1,302	932	940	948
Oct.	....	998	...	921
Nov.	....	1,099	...	859
Dec.	....	1,262	...	833
Total ...	....	10,400	...	7,347

Radio-Electronics-Television Mfrs. Assn.

go to 120-125 per cent of 1954 totals when the new year comes.

Freight Cars Roll Along . . .

Even freight car orders, a slow starter, are holding the pace.

October orders jumped from a September slump of 3228 to 12,843, as individual lines kept up the buying spree to help boost shipping along. Lifting of government restrictions on railroads in the coming year most likely will keep railroaders coming back for more cars all through 1956.

Walter J. Tuohy, president of Chesapeake & Ohio Railway, announced that C & O will boost its freight car fleet by 6000 cars, most of them coal carriers.

In explaining why C & O believes in a good business future, Mr. Tuohy said: "Total overseas export of coal from the U. S. probably will reach 32 million tons this year, more than double the 15.3 million tons of 1954."

One minor flaw in the picture is the increased number of business failures. Dun & Bradstreet reports that the 919 failures in October reached a postwar high, 12 per cent more than September and 6 per cent up from a year ago. This is in contrast with the tendency for fewer failures in the fall months just before Christmas, but it seems likely that the number of failures will decrease until after the first of the year. Then the post-holiday slump may take its toll.

More Businesses Incorporate . . .

On the other hand, new business incorporations have risen steadily this year as more people venture into the business ring to collect a share of the profits.

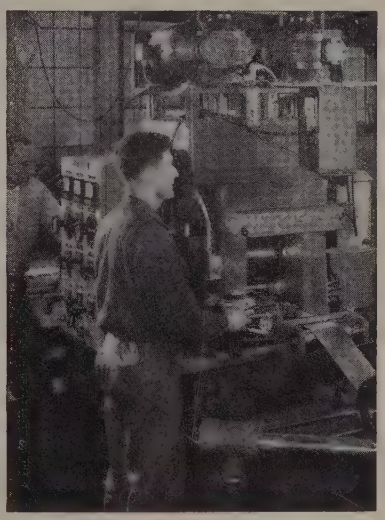
At ten months, incorporations stood at 117,955 compared with 95,448 for the same period last year. Chances are the increase will continue through the rest of this quarter.

Trends Fore and Aft . . .

Leece-Neville Co., Cleveland, maker of electrical equipment for automotive and allied industries, reports that fractional horsepower motors will account for greatly increased sales in the months ahead . . . Gardner-Denver Co., Quincy, Ill., adds that incoming orders suggest business will remain high for the rest of the year. The company plans to buy more tools and facilities to boost 1956 output of its air compressors, air tools and other products.

MONEL • NICKEL • COPPER • ALLOYS
THIN STRIP

±.0004″ is run-of-the-mill



Typical of the care that assures absolute uniformity in all Somers THIN STRIP is this 4-high mill equipped with the latest electronic gages and controls. Here thickness is constantly checked throughout the run, and maintained within ±.0004″ or less on gages from .010″ down. The slightest variation may be instantly corrected.

No matter how exacting your requirements may be for thin strip metal, you can depend on Somers quality control, equipment and experience to guarantee uniform quality every time—all the time.

Somers Brass Company specializes in rolling nickel and its alloys from .020″, and copper and its alloys from .012″ both down to .00075″.

If you now have, or anticipate, a problem with exacting standards of this strip metal write:

FOR EXACTING STANDARDS ONLY
Somers

Somers Brass Company, Inc.
WATERBURY, CONN.

TINNERMAN Speed Nut SAVINGS STORIES

Cost-Cutting Chain Reaction Triggered by SPEED CLIP®!

Savings for the parts supplier, the television manufacturer and the ultimate user! That's the triple play that begins every time Centralab, division of Globe Union, Inc., Milwaukee, Wis., assembles a "Snap-Tite" television control. Here's why: There's a job-engineered Tinnerman SPEED CLIP in every control assembly.

A simple two-at-a-time hand operation speeds assembly of controls to chassis for an amazing 73 per cent savings in time. No special skills or tools are required. Spring steel fingers of the SPEED CLIP snap past the panel as inserted . . . hold the controls firmly in place and automatically spaced away from the chassis. Removal for service is simply a matter of pinching the spring fingers inward and slipping the control free.

Another example of Tinnerman fastening know-how, this part is just one of more than 8,000 SPEED NUT brand fasteners designed to make standard or complex attachments. SPEED NUTS can bring savings to you, too. See your Tinnerman representative soon and write for your copy of "SPEED NUT Savings Stories".

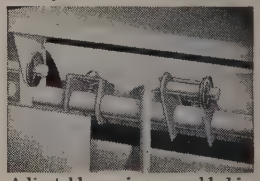
TINNERMAN PRODUCTS, INC. • BOX 6688, DEPT. 12, CLEVELAND 1, OHIO

Canada: Dominion Fasteners, Limited, Hamilton, Ontario. *Great Britain:* Simmonds Aerocessories, Limited. Treforest, Wales. *France:* Aerocessoires Simmonds, S. A., 7 rue Henri Barbusse. Levallois (Seine). *Germany:* Hans Sickinger GmbH "MECANO", Lemgo-i-Lippe.

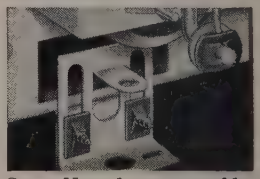
TINNERMAN Speed Nuts® FASTEST THING IN FASTENINGS®

OTHER USES FOR SPEED NUTS

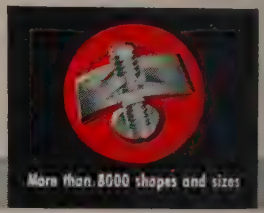
Special SPEED CLIP gives desks extra model flexibility and saves money.



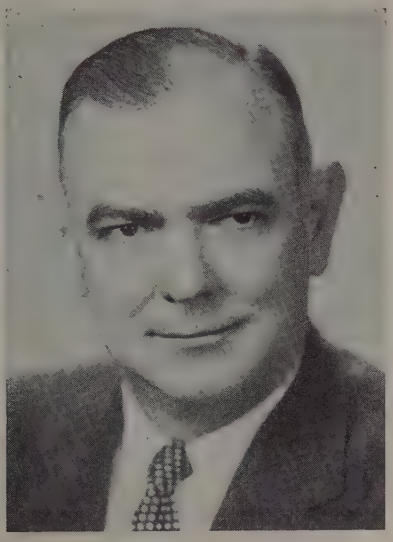
Adjustable awning assembled in 63% less time with special SPEED NUTS.



SPEED NUTS lower assembly costs 40% on casement-window air conditioner.



CHARLES F. MYERS
. . . Morse Twist Drill president



RANSOM B. De LISLE
. . . Niagara Machine & Tool p. a.

HIRAM B. WARNER
. . . manages McLouth Steel plants

Morse Twist Drill & Machine Co., subsidiary of Van Norman Co., at New Bedford, Mass., elected **Charles F. Myers** president, **James Y. Scott** chairman of the board, **I. J. Hayes** executive vice president-general manager. Mr. Myers was vice president-sales.

William G. Harter, effective Dec. 1, becomes vice president and treasurer of **Continental Steel Corp.,** Kokomo, Ind., to succeed **Urlin K. Becker** who will retire. **S. C. Land** will be secretary and **George V. Reed** assistant treasurer.

G. W. Reese was named vice president-manufacturing for **American Can Co.,** New York. He was vice president in charge of the Atlantic division.

Jesse A. MacIntire Jr., Chicago district manager, was promoted to manager, wire braid hose sales for **Republic Rubber Division,** Lee Rubber & Tire Corp., Youngstown. He is replaced at Chicago by **Irving G. Wollter,** formerly a field representative in Chicago.

Donald C. Duncan was made general manager, Berkeley Division, **Beckman Instruments Inc.,** at Richmond, Calif. **Thomas Allinson** was made manager. He reports to Mr. Duncan and continues as general manager of the Helipot and Arga Divisions in South Pasadena, Calif.

Ransom B. De Lisle joined **Niagara Machine & Tool Works,** Buffalo, as purchasing agent. He was formerly associated with Pittsburgh Metallurgical Co. Inc. as general purchasing agent and traffic manager, and with New York Central System's engineering department.

Frederick A. Wunderlich was made general operating manager-manufacturing, **Chrysler Division,** Chrysler Corp., Detroit. He has been general works manager since 1948.

John F. Crowell was appointed sales manager of the **Centra-Point Division** of William H. Field Co. Inc., Boston, formed to manufacture and sell the firm's new end mill grinder.

Allegheny Ludlum Steel Corp. appointed **Clifford W. Briggs** production control manager and **Charles G. Hathaway** customer service manager at its Brackenridge, Pa., plant.

Don P. Carr, as assistant to the manager of **Crucible Steel Co. of America's** tool steel sales division, is responsible for sales in the West Coast sales division. He has offices in Los Angeles.

Charles Saso was made vice president and plant manager of **Technion Design & Mfg. Co. Inc.,** New York.

Hiram B. Warner, as plant manager, directs operations of **McLouth Steel Corp.'s** Trenton and Gibraltar, Mich., plants.

Seymour Blechman was elected executive vice president of **Brooks Rotameter Co.,** Lansdale, Pa. He was vice president-sales manager at Fischer & Porter Co.

William E. Muther was made manager of manufacturing and estimating for **Rucker Co.,** Oakland, Calif. He was chief engineer of Oakland Machine Works.

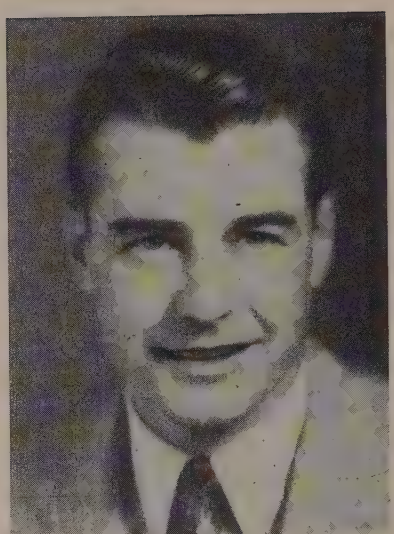
National Wire Products Corp., Baltimore, elected **E. V. Reckley** vice president-sales.

Richard F. Trimbach was made manager, new product development, **Loewy Construction Co.,** division of Baldwin-Lima-Hamilton Corp., New York.

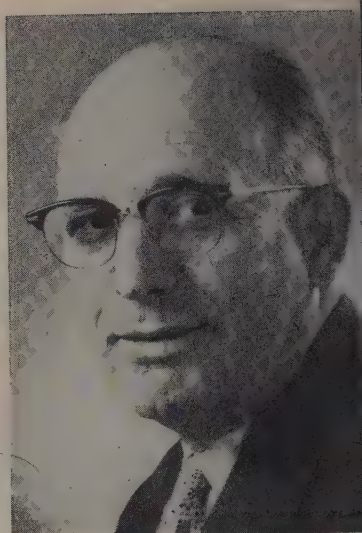
Kenneth L. Snover was made assistant to the vice president-manufacturing for **International Business Machines Corp.,** New York.

Kenneth Michel was made general manager of the new Sunex division of **Sun Tube Co.,** Hillside, N. J., formed to manufacture aerosol valves, polyethylene bottles and plastic closures. He is succeeded as sales manager, impact extrusion division, by **Richard McCarthy. Donald Goff** was made production

RAY C. REINHARTSEN
. . . Ekstrom, Carlson gen. sales mgr.



C. R. TERPENING
. . . Rimat Gage sales manager



EARL M. DOUGLAS
. . . new vice president of Dana Cor

manager of the Sunex division. **Claude Alexander**, production manager of the Washington plant, now makes his headquarters in Hillside as assistant to the president.

Ray C. Reinhartsen was made general sales manager, **Ekstrom, Carlson & Co.**, Rockford, Ill. He was vice president-general manager of Onsrud Machine Works Inc. Named exclusive representatives to the aircraft industries are **Fred J. Heid** (eastern United States) and **G. R. Gordon** (western United States). Mr. Heid for the last eight years served as general sales manager. Mr. Gordon was assistant chief tool engineer in charge of manufacturing research for Convair, division of General Dynamics Corp.

Weirton Steel Co., Weirton, W. Va., division of National Steel Corp., appointed **William Zatezalo** assistant to the manager, steel works department.

Coffing Hoist Division, Danville, Ill., Duff-Norton Co., appointed **Andrew M. Kelly** manager of a new customer service department.

Donald B. Roberts was made Missouri Valley division manager for **Permacel Tape Corp.** He has headquarters in St. Louis.

J & S Steel Corp., Chicago, appointed **L. C. Beckerich** assistant to the vice president. He will assist in procurement of materials and is responsible for sales in the Indiana-Michigan area.

C. R. Terpening fills the new post of sales manager, **Rimat Gage Co.**, Pasadena, Calif. His former associations are Pratt & Whitney Division, Niles-Bement-Pond Co., and Sheffield Corp.

Harold Scrutton was made Southeast district manager for **Hobart Bros. Co.**, with headquarters in Gastonia, N. C. **John H. Headapohl** joined the firm as sales engineer specializing in automatic welding.

C. A. Murchison was made industrial sales manager of **Armstrong Furnace Co.**, Columbus, O.

K. C. Carnes was elected vice president of **Toledo Engineering Co.**, Toledo, O.

A. F. Scarr was appointed assistant to the vice president and general manager of **Kaiser Steel Corp.**, Oakland, Calif. He replaces **Jack J. Carlson.**

John D. Sutherland fills the new position of assistant division superintendent of steel producing at the Fairless, Pa., works of **U. S. Steel Corp.**

J. B. Klassen was made general manager, La Porte, Ind., works, **Allis-Chalmers Mfg. Co.**

Daniel J. Girardi was appointed metallurgical engineer in charge of research and process control at **Timken Roller Bearing Co.**, Canton, O.

Earl M. Douglas, formerly v president-manufacturing of Stu baker-Packard Corp., was nam vice president of **Dana Corp.**, T ledo, O., with responsibilities ov technical activities related to pr uct engineering.

Tom Barrett was made assista sales manager, **Wisconsin Mo Corp.**, Milwaukee.

Howard W. Geyer was made fir shift superintendent and **Jose M. Stana** second-shift superinte ent at **Warner & Swasey Co.**, Cle land.

Robert G. McCoy was named pl industrial engineer of the Fe dale, Mich., plant of **Republic St Corp.'s** steel and tubes division. succeeds **William J. Nelson,** r methods engineer at the gene office of the corporation at Cle land. Mr. McCoy is now on s cial assignment to the Trus Steel Division, Youngstown.

Chris J. Witting was appoin general manager of consu products for **Westinghouse E tric Corp.**, Pittsburgh. He succe **John M. McKibbin** who joins staff of **John K. Hodnette,** v president-general manager.

R. J. Sargent was made gene manager of **Westinghouse Elec Corp.'s** new major appliance d sion. He continues headquarters Mansfield, O.

W. M. Hawkins was named

ANOTHER EXAMPLE OF
REDUCING COSTS WITH—

Buhr

ECONOMATION

Economy and auto*mation* are combined in this Special to form another example of the way Buhr *Economation* reduces production costs for leading manufacturers.

This 6-way dial-type hydraulic-feed Buhr Special is equipped with a 72″-diameter 8-position automatic index table, complete with shot bolt.

Chip disposal is accomplished by an automatic rotating chip conveyor, attached to index.

Operations formerly accomplished by eight machines were combined in this Buhr Special —and volume of production was increased! . . . A typical example of Buhr Economation!

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MULTIPLE-SPINDLE
IGH PRODUCTION MACHINERY

See what Buhr Economation can do to reduce your production costs. A phone call, wire or letter will bring you a prompt consultation with one of our top sales executives.

BUHR MACHINE TOOL CO.©
ANN ARBOR, MICHIGAN

Solidly Engineered • Precision Built • for World's Leading Manufacturers

Angeles district manager for **Consolidated Engineering Corp.**

Donnell W. Newman was made Chicago district sales manager, **U. S. Steel Supply Division, U. S. Steel Corp.**

W. S. Long was made vice president-operations at **Calstrip Steel Corp.**, Los Angeles.

Edmund L. Fitch was made sales promotion manager for **Howe Scale Co. Inc.**, Rutland, Vt.

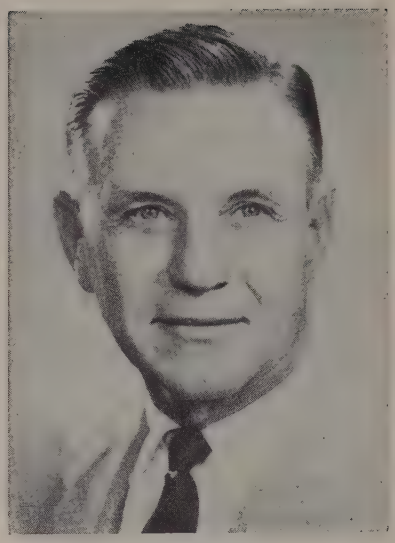
F. Kenwood Jones succeeds **Howard P. Chace**, retired, as chief sales engineer of **Norton Co.'s** grinding machine division.

Robert W. Bruins fills the new post of manager of handler sales for **Colson Corp.**, Elyria, O. He was general manager of Gilbert Mann Co.

Bruce D. Henderson was named operating vice president and division manager in charge of the air conditioning division of **Westinghouse Electric Corp.** at Staunton, Va. **John A. Gilbreath**, who has been manager of the plant, is now manager of the division's packaged products department, a new position. Mr. Henderson succeeds **H. E. Seim**, Westinghouse vice president in charge of both the air conditioning and the Sturtevant Divisions. Mr. Seim will devote full time to operations of the Sturtevant Division at Boston.

John K. Segrave was made branch manager of the new Houston warehouse of **Rolled Steel Products**, division of Emergency Steel Service Corp.

Philip W. Scott was named assistant to the president of **Bryon Jackson Division**, Los Angeles, Borg-Warner Corp.



CARL F. SCHULTZ
. . . *Motor Wheel Corp. v. p.*

Carl F. Schultz was elected vice president-automotive sales of **Motor Wheel Corp.**, Lansing, Mich., to succeed the late **C. S. Holden.** Mr. Schultz was sales manager, pressed steel division.

A. J. Allcock Jr. was made chief staff engineer of **Sterling Electric Motors Inc.**, Los Angeles.

J. William Kelly heads electric truck sales for **Clark Equipment Co.**, Battle Creek, Mich.

C. H. Wheeler Mfg. Co., Philadelphia, formed an atomic energy division. **Belden S. Tucker**, former general sales manager, economy pumps division, was made sales manager for the new division.

Dick A. Miller was named plant superintendent, **Bassick - Sack Division**, Winston-Salem, N. C., Bassick Co., subsidiary of Stewart-Warner Corp.

Clement N. Williams was made assistant sales manager, **Lewis-Shepard Products Inc.**, Watertown, Mass. He was with Clark Equi ment Co., for the last five yea New England sales manager.

Michigan Chemical Corp., S Louis, Mich., appointed **Dr. Dwig Williams** director of research.

Donald V. Sarbach fills the ne post of research director of **Hewit Robins Inc.**, Stamford, Conn.

George J. Groya was made servi manager, **Delta Power Tool D vision**, Rockwell Mfg. Co. He h headquarters in Pittsburgh. H was Chicago district sales ma ager.

Fred S. Haas was named directo of product engineering of **Natio al Automatic Tool Co.**, Richmon Ind. For the last 30 years M Haas has been with Cincinna Milling Machine Co.

T. H. Bartholomew was name manager, procurement department tar products division of **Kopper Co. Inc.**, Pittsburgh. Formerl contract manager for the depart ment, he replaces **H. B. Cumming** who was named assistant man ager, marketing department sales

W. M. Champion was made distric manager of **Air Reduction Sale Co.'s** Shreveport, La., sales office He replaces **John Lund** who ha left the company.

Andrew F. Hillhouse was name manager of **Solar Aircraft Co.'** Washington office to replace Joh **H. Baker**, resigned.

Wilfred A. Smith was named man ager of new products sales fo **B. F. Goodrich Co.'s** industria products division, Akron.

Morton L. Zalk, formerly wit Duluth Iron & Metal Co., is no associated with **Hyman - Michael Co.** as St. Louis district manage He is located at Alton, Ill.

OBITUARIES . . .

John J. Hyland, 51, founder and chairman of **Control Instrument Co. Inc.**, Brooklyn, N. Y., died Nov. 11.

Willard W. Oliver, 67, a retired vice president of **W. A. Case Co.**, Buffalo, died Nov. 5 in Charlottesville, Va.

Robert T. Lapham, 66, partner in **Lapham-Hickey Co.**, Chicago, died Nov. 13.

J. Carl Bode, 53, president of **National Carbide Co.**, a division of Air Reduction Co. Inc., New York, died Nov. 11.

Karl M. Lyons, 66, director of sales for the container division of **Jones & Laughlin Steel Corp.**, New York died Nov. 13.

Max Schott, 79, a director an former president of **Climax Mo lybdenum Co.**, died recently.

Anthony M. Gabriel, 60, owner o **Hillside Tool & Die Co.**, Hillside N. J., died Nov. 8.

enton Harbor foundry installs electric furnace as . . .

Castings Demand Gains

NSTALLATION of an 8-ton elec-ic furnace opens a new industrial ase at Superior Steel & Malle-le Castings Co., Benton Harbor, ich. It will enable the plant to uble its production, says Ross L. lmore, president.

The new furnace, made by Whit-g Corp., Harvey, Ill., gives the mpany two electric units and one en-hearth furnace. Total instal-tion cost was $100,000.

Up to 15 Tons—Before the new rnace was put into operation, the eel Foundry Division had equip-ent and tools to produce 700 tons castings (which range from 1 nce to 30,000 lb) per month.

It takes one and one-half hours charge and melt a heat. With e plant operating on two 8-hour ifts, this means the process is peated ten times daily.

Besides the large amount of elec-icity required to operate the fur-ce, the company uses 10,000 llons of water daily to keep the rts of both electrical units cooled.

The furnace was installed by arson Construction Co. in near-cord time. It took only three onths to get the unit in opera-on. Normally, it takes eight or ne months.

As the plant continues to expand, it's possible still another furnace may have to be added. But it won't be for at least two or three years, Mr. Gilmore says.

Detroit Harvester Buys Firm

Detroit Harvester Co. purchased Peters-Dalton Co., both of Detroit, producer of spray booths, washers and ovens for the automotive and other metalworking industries. This is part of a long-range expansion and diversification program of Detroit Harvester, producer of automotive parts and equipment, power lawn mowers and farm mowers.

Frasse Installs Huge Saw

Peter A. Frasse & Co. Inc., New York, has installed an abrasive saw that promises to accelerate greatly the cutting of heavy stainless steel and aluminum plate. The machine is 24 ft long and is capable of cutting plate up to 240 ft long. Frasse has expanded its stocks of stainless steel plate.

Hunter Builds Aluminum Mill

Hunter Douglas Corp., Riverside, Calif., is building a $5-million aluminum processing plant at Flemington, N. J. The plant will double the firm's productive capacity and marks its first direct entrance into eastern markets. Continuous machinery, developed by Hunter Douglas, casts aluminum alloy into bars and then into strip.

Liquidates Stamping Plant

Knickerbocker stamping plant, Parkersburg, W. Va., has been sold to Broughton Dairy Inc., Marietta, O., and will be used for food processing. The equipment, including presses, shears and press brakes, will be sold by Hetz Auction Sales Inc., Warren, O., Dec. 6.

Oster Enters New Field

Oster Mfg. Co., Cleveland, is entering the material handling equipment field. The company, well known for its line of pipe and bolt threading machines, will market next year on an international basis a line of multipurpose, hand-propelled, hand and battery-operated portable lifts with capacities up to 2000 lb.

Le Roi Opens Branch Plant

Westinghouse Air Brake Co.'s Le Roi Division, Milwaukee, established a branch plant at 5000 45th West Ave., Tulsa, Okla. Le Roi makes internal combustion engines, air compressors and air tools for the construction and mining industries.

Parker-Kalon To Move

General American Transportation Corp.'s Parker-Kalon Division, maker of self-tapping screws, is moving into its new 267,000-sq-ft plant in Clifton, N. J. Facilities will provide a 25 per cent increase in capacity.

Ohio Moulding Changes Hands

Ohio Moulding Corp., a newly organized firm, purchased Ohio Moulding Co., maker of roll formed metal shapes. Officers of the new firm include: Alex Miller, chairman of the board; Fletcher Gleason, president and treasurer; Lewis Miller, executive vice president; Harry Reznick, secretary. The company plans to enlarge the business, including the purchase of additional equipment and expan-

sion of its plants in Cleveland and Wickliffe, O.

Kaiser Orders Rolling Mill

Kaiser Aluminum & Chemical Corp., Oakland, Calif., awarded a contract for an aluminum hot-rolling mill installation for the Ravenswood, W. Va., Works to Loewy-Hydropress Rolling Mill Division, Baldwin - Lima - Hamilton Corp., New York.

Wesson Opens Canadian Plant

Wesson Co., Detroit, producer of cemented carbide metal cutting tools, is expanding its Canadian operations with the opening of a new division, Wesson Cutting Tools Ltd., Toronto, Ont. The division will be headed by H. B. Iron, president, and L. P. Chapman, vice president in charge of sales. Initially, manufacturing operations will consist of standard and special single-point tool fabrication.

Wire & Cable Firm To Move

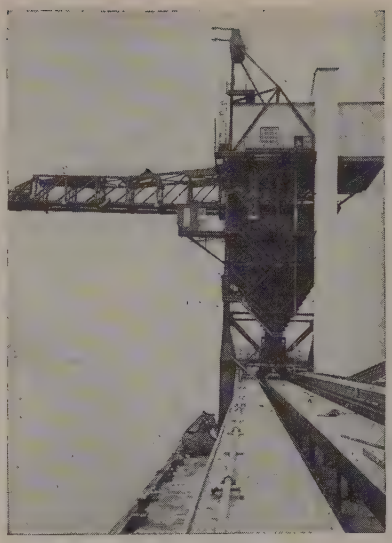
Ansonia Wire & Cable Co., Ansonia, Conn., will move to Cumberland, R. I., occupying a 120,000-sq-ft plant to be completed next spring by Rhode Island Business Development Co. at a cost of $1 million.

J&L Builds in Tulsa, Okla.

Jones & Laughlin Steel Corp., Pittsburgh, is building a $1.5-million headquarters building at Tulsa, Okla., for its Supply Division. It will contain more than 100,000 sq ft of floor space and will be ready for occupancy in September, 1956.

Kewanee-Ross Corp. Dissolved

American Radiator & Standard Sanitary Corp., New York, dissolved its wholly owned subsidiary, Kewanee-Ross Corp. The corporation formed two divisions to continue Kewanee-Ross operations. The Kewanee Boiler Division is headed by W. B. Russell, president, and E. M. Palmer, executive vice president. Ross Heat Exchanger Division is headed by J. C. Linsenmeyer, president, and R. S. Reade, executive vice president.



Operator Gets Lift

This traveling coal unloading tower is unique in that it has a built-in elevator for maintenance and operating personnel. Built by Mead-Morrison Division, McKiernan-Terry Corp., the 136-ft-high tower is equipped with a 10-ton-capacity grab bucket, has a free-digging rate of 850 tons per hour and has a 150-ton receiving hopper

Kelsey-Hayes Completes Merger

Kelsey-Hayes Wheel Co., Detroit, merged with Steel Products Engineering Co., Springfield, O., maker of aircraft parts and ordnance equipment, as well as other precision equipment and machine tools.

Buys Detroit Sintered Metals

Bunting Brass & Bronze Co., Toledo, O., purchased Detroit Sintered Metals Corp., Detroit, manufacturer of bearings and parts made of powdered metals. The new property will be operated as a wholly owned subsidiary. Detroit Sintered Metals is building a plant at Kalamazoo, Mich., to increase production.

Hubbell Metals Opens Branch

Hubbell Metals Inc., St. Louis, opened a plant at 484 S. Front St., Memphis, Tenn. It will carry stocks of steel (including stainless), brass, copper, magnesium, aluminum, fasteners, fittings, valves and accessories. It will provide shearing and cutting service. Howard Broemmelsick manager.

Hallden Boosts Plant Capacit

Hallden Machine Co., Thom ton, Conn., completed an addit to its factory which increa manufacturing floor space about 60 per cent and allows expansion of office quarters. firm makes automatic guillot and rotary-type shears straightening equipment for sh and wire.

Etna Machine Builds Plant

Etna Machine Co., Toledo, manufacturer of heavy-duty t mills, tube cut-off machines, sw ing machines and allied equipm is erecting a plant near Perr burg, O. Estimated cost is $3 000.

U. S. Industries Buys Firm

U. S. Industries Inc., New Yo purchased Southern Pipe & Cas Co., maker of steel pipe for transmission of water, oil and g The plant is near Azusa, Ca U. S. Industries recently purcha Garrett Oil Tools Inc., Longvi Tex.

Erie Selects Repair Shop Site

The Erie Railroad will build $2-million freight car repair sh at Meadville, Pa., to replace one at Dunmore, Pa., which w destroyed by flood waters follo ing Hurricane Diane.

Ships Nonreturnable Reels

Anaconda Wire & Cable C New York, has adopted a progr of making shipments of cert types of wire and cable on non turnable reels. Initially, the p gram will be restricted genera to shipments of building wire ite to distributors' stocks and to a minum insulated and covered c ductors. Customer benefits: El ination of reel deposit charg clerical records for the main nance of reel data and reel retu to the manufacturer; reduction storage space and in over weight.

Technical Outlook

ALUMINUM CHAIN—Electrically welded by automatic equipment, it's being made for the first time in sizes ranging from ¼ through ½-in. by McKay Co., Pittsburgh. Size for size, its load limit is about 60 per cent that of steel chain; it weighs 65 per cent less, is nonsparking, nonmagnetic and has good corrosion resistance. Chiefly for decoration now, aluminum chain is a natural for outdoor use—fences, railings, marine and architectural applications. Industrial uses are developing, too.

PHOTO METAL—Anodized aluminum with emulsion embedded in the surface pores makes a photographic printing plate with superior wear resistance. Under the name Metalphoto, it is being used for name plates, badges, signs, slide rules, charts and drawings that get rough handling, instrument dials and similar items. It gives a jet black image against an aluminum background which can be colored by staining.

METALLIZED SANDWICH— A thrust collar for a hydroelectric unit was repaired by spraying 0.003-in. of molybdenum onto the surface before 0.25-in. of steel was applied. Result: A sprayed sandwich. The molybdenum layer served as a bond. Surface preparation involved boring the collar true, cutting eight V-threads per inch on the ID, then roughing with a rotary-shaft preparing tool.

SMALLER BUT STRONGER—Remove the right amount of material from the shank of a bolt and you will increase its impact strength several times, Oran A. Pringle, University of Missouri, told the ASME at Chicago. The method is used to strengthen bolted joints against shock loads. Reduced shock permits more elongation during tightening. Resistance to fatigue is better. Prof. Pringle said the method is valuable in construction of combustion engines, railroad car carriages, rock crushers and other machinery where parts bear sudden and repeated shock loads.

LOOK AHEAD—A prediction made at the annual meeting of the Porcelain Enamel Institute: By 1960 every house built in this country costing less than $15,000 will be built with prefabricated parts. Many will be steel, colored with porcelain enamel for color fastness and freedom from maintenance.

EPOXY STICKS—Sterling Grinding Wheel Co., Tiffin, O. is using an Epoxy-resin-based adhesive to cement an aluminum insert to a vitrified wheel used for valve seat grinding. Advantages: High bond strength under heavy loads, no warpage.

LIQUID METAL COOLED—The Consumers Public Power District of Nebraska has a proposal before the AEC to build a sodium-cooled, graphite-moderated, nuclear power plant to turn out 75,000 kw. It is to be completed in 1959. Design phases will be carried out by North American Aviation Inc.

SAVE ON START-UP— We can save $½-million a year by using natural gas to light up our open-hearth furnaces after rebuilding, says George Grosvenor, open-hearth superintendent, Colorado Fuel & Iron Corp. He told the Chicago regional technical meeting of the American Iron & Steel Institute that savings come from: 1. Less time needed to light up furnaces. (In this 16-furnace shop, furnace time is worth $150 an hour.) 2. More production. Furnaces are turning out their maximum after the second heat. 3. Better roof life. 4. Lower fuel costs.

Metalworking Outlook—p. 59 Market Outlook—p. 135

Wear testing at the American Brake Shoe Co. research laboratory

War on Wear

By VAN CALDWELL
Associate Editor

Wear is a fact of life. Nobody seriously considers getting along without it. The problem is to get along with it

LIVING in the midst of wear, we are inclined to regard it like the weather. But unlike the weather, we are doing something about it.

Because it takes so many forms, wear is hard to pin down.

It is a slow process (usually).

It is characterized by removal of material, resulting in dimensional changes (but not always).

It is unintentional (unless we put it to use, as in wear-in).

It results from pressure and contact of two bodies (but vibration, heat and corrosion can also enter the picture, and one body can be liquid or gaseous).

For all its familiarity, wear is something we don't know much about. Fortunately, we have some guides to follow in fighting it.

Identify — One of the first precepts of war is: Identify the enemy—a good lead to follow when fighting wear. You can recognize the forces as impact, friction (adhesion), abrasion, vibration, heat, corrosion and pressure.

Though they are always found working in combination, certain forces will stand out. Adhesive-abrasive wear is so common in machines that it is usually what we have in mind when we say "mechanical wear." But there other possibilities. For exam in an automobile, corrosion can the dominant factor in top cy der wear, with abrasion stand out in the area of ring travel.

Tests — Sometimes wear is plain as the gouges on a bulldo blade. All too often wear is h den, and due to a combination circumstances. In such ca wear tests may help identify causes and determine their r tive importance.

Nobody agrees on a good w test. Service testing is usu too slow and too costly. T that simulate service end up exaggerating for the sake o fast answer. Providing you rec nize the limitations and are ca ful about extrapolating data fr

e wear situation to another, test- can be a big help.

Plan of Attack—There's a second ecept of war that holds for wear: vide and conquer. It's a lot sier to fight wear when the uses can be separated and neu- lized separately.

The countermeasures break down o four general types: 1. Change e environment. 2. Provide a rrier. 3. Change the material. Change the design.

Environment—A shaft that op- ates in a corrosive atmosphere s two strikes against it. Be- les the frictional stresses im- sed on it by load and motion, it s to contend with chemical at- k. If ventilation or sealing can t a clean atmosphere around the aft, the frictional problem nds isolated and easier to solve. Air conditioning (including heat- , cooling, drying, humidifying, aning) isn't the only way to ange the environment. Meas- ures to stop vibration may be just as important. Of course, there are plenty of times when nothing can be done to change wear conditions. A barrier is called for.

Interpose — Leonardo da Vinci had the right idea when he wrote: "All things and everything whatsoever, however thin it may be, which is interposed in the middle between objects that rub together lighten the difficulty of this friction." Today, we assign this role to lubrication.

A lubrication engineer, touring the recent Machine Tool Show, asked: "Where do you put the oil?" Oil cups, buried sumps and hidden ports were sometimes as out of date as the rest of the machine was modern.

His headshaking comment: "If they would only call in lubrication engineers when they design these machines, think of the grief we could save them." It's worth remembering that lubrication is as much a part of design as mechanism.

No Dirt—To be of full value, lubrication demands cleanliness. Filters, seals and covers are as much a part of the lubrication picture as oils and greases. There's a lot of truth in the complaint of Chrysler's wear expert, W. E. Jominy: "I wish there were more profit in servicing the air cleaner."

Lubricants are triple-threat wear preventers. They make a cushion, flush away grit and act as heat-exchange mediums. They fail to prevent wear when pressure and friction combine to wipe clean the high points of adjacent surfaces so that they weld together.

What's Ahead—The best lubricants won't prevent some weld-and-break contact, but the ideal toward which engineers are working is perfect hydrodynamic lubrication in which an unbroken liquid film carries the load. We can, in effect, hasten that day by super-

For Wear Resistance, Change the Surface

Technique	Applicable to	Effect	Protects against
Electroplating Chromium Nickel	Most ferrous and nonferrous materials	Hard, smooth, usually thin, surface layer. Degree of porosity can be controlled	Heat, corrosion, abrasion
Anodizing	Aluminum, magnesium, zinc	Hard, thin oxide layer	Heat, corrosion, friction, abrasion
Diffusion (impregnation) Carburizing Carbonitriding Cyaniding	Steel only (usually low carbon steel)	High carbon or high nitride (or both) case; surface hardness	Friction, abrasion
Nitriding	Steel containing nitride forming elements	Hard nitride case	Friction, impact, corrosion, vibration
Chromizing	Iron and steel, nickel, cobalt, molybdenum	Stainless steel case	Corrosion, heat, friction
Siliconizing	Iron and steel	Iron-silicon alloy case	Friction, corrosion, heat, impact
Aluminizing	Iron and steel	Iron-aluminum alloy case	Heat, corrosion
Spraying Metallizing Ceramic spraying Flame plating	Metallic and nonmetallic base materials	Layer of interlocked particles, usually part oxidized, and porous	Friction, heat, corrosion, abrasion, depending on material sprayed
Hard facing Gas welding Arc welding	Ferrous and nonferrous metals	Heavy alloy or carbide layer with properties depending on the material deposited	Impact, heat, corrosion, abrasion, friction, vibration, depending on material deposited
Chill casting	Gray iron, some steels	White iron surface	Abrasion, impact
Surface hardening by flame or induction	Iron and steel	Local surface hardness, depending on area heated, time, temperature, quench and material	Abrasion, friction, vibration, impact

War on Wear: Divide and Conquer

Type of wear	Probable cause	Preventive Measures
Erosion Scratching Grinding Gouging	Abrasion	Air cleaners; oil filters; dust covers; seals; lubricants to flush away grit; tough malleable materials; ductile bearing materials; parts designed for economical replacement
Smoothing Seizing Galling Scuffing	Friction (Adhesion)	Better hydrostatic lubricants; self-lubricating materials; better methods of lubricant application; lighter loading; fine surface finish; coatings; surface films and controlled wear-in
Deformation Cracking Cavitation Flaking	Impact	Hard case-tough core materials achieved through heat treatment, cold working, hard surfacing; shock absorbing devices
Fatigue Cracking Fretting	Vibration	Changes in amplitude and frequency of vibration; dampers; elimination of stress raisers such as notches and sharp angles; cold-worked surfaces; changes in pressure
Solution Scaling Pitting Oxidizing	Corrosion	Detergent lubricants; moisture control; materials and surfaces exhibiting low chemical activity; electrically compatible materials
Creep Softening Scaling Crazing Growth Cracking	Heat	Cooling systems for lubricants and atmosphere; materials that are excellent heat conductors or reflectors; lower unit pressures; materials with high hot strength

finishing or lapping mating surfaces, or by careful run-in.

A considerable amount of wear prevention is going to come from improved methods for applying lubricants. Spray methods are gaining in popularity. A General Motors wear expert thinks we ought to spray gears as they come *out* of mesh. Advantages: Quick flushing of surface heat from the teeth and removal of excess lubricant (and the resulting pressure build-up between teeth) by centrifugal force.

Self-Lubrication—Much is to be expected, too, from materials that have some properties of self-lubrication: Gray iron, plastics like Nylon and Teflon and oil-impregnated powder metal products.

One example: The Navy reports a film of Teflon, originally applied to small arms as a corrosion barrier, confers long-lasting frictional protection. It acts as a dry lubricant for low loads and moderate speeds.

Material—When nothing can be done to improve environment or lubrication, then it's time to think about changing the wearing material. A Royal Dutch Shell engineer suggests a philosophy for picking something better: 1. Convert destructive to permissible wear. 2. Divert the direction of attack. 3. Protect the surface.

A metal which wears in to a low-friction finish, or one, like aluminum, that corrodes to form a wear-resistant surface film are examples of No. 1. Sleeve and split bearings are examples of No. 2. Wear is shifted to a material that can be economically replaced. Surface protection, No. 3, offers by far the widest range of choice. It is also the area where changes are coming fastest.

Surface—The fact that we can change the wear pattern by changing materials seems to imply that wear resistance is an innate property of materials. Not so, say the experts. Conditions of service are everything; the material that serves perfectly in one application can fail miserably in another. For certain types of wear, however, it is possible to build up order-of-merit lists as a guide (right).

Such a list would apply whether a material is used for hard-facing or for the basic structure. When considering surface protection, the choice is between materials wh accept surface treatments diff ently, and between types of tre ments. For an idea of the pos bilities, see the charts.

Eyes Open—Each new devel ment in machines, transportat and atomic energy creates w situations that seem beyond i mediate solution, yet frequen the answers lie in materials a methods available and waiting be tried.

How well are you keeping with what is new in the wear sistance picture? Here are so recent developments.

Aluminum coatings: Dippi processes (Aldip, Alumicoat) g carbon steel and other base ma rials an aluminum coating wh increases hot wear resista many-fold. They are being us on automobile valves and exha manifolds.

Flame plating: Tungsten c bide coatings are applied on wide variety of materials by sho ing molten carbide powder fr a "gun" with explosive force.

Organic coatings: Some of t newer ones are good enough give substantial abrasion resi

ce to vacuum metallized coat-
gs. Vacuum metallizing be-
mes useful for such applications
hardware finishing.

Metal spraying: The familiar
hnique has been extended to the
raying of nonmetallics, such as
minum oxide.

Vapor plating: Sometimes called
s plating, it's a technique adapt-
le for depositing a wide range
coatings (metallic and nonme-
llic) on an equally large range of
se materials. Coatings can be
ick or thin.

Porous chromium: Etching proc-
ses give chromium plate a pin-
int or channel-type porosity
hich adds oil-holding ability to
e natural wear resistance of
romium.

Uncommon coatings: For wear
sistance under highly corrosive
nospheres or at high tempera-
res look to coating materials too
pensive for routine use. Coat-
gs of cobalt, tungsten, boron,
ntalum and vanadium can be
oduced by electrodeposition, ce-
ntation or vapor plating.

Hard chrome and nickel: As
ated coatings, they are being in-
easingly used for protection of
rts subject to high wear such as
ls.

Strippable coatings: Polyvinyls,
etates and butyrates, usually ap-
ed by dipping, are giving metal
rts impact and scratch protec-
n as well as corrosion resistance
ring handling and storage.

Electropolishing: It can great-
reduce microroughness (from a
oped 4 micron rms surface to
3 microns rms, for example), to
duce metal-to-metal friction.

Sherardizing: This old-time
tch method for producing abra-
n-resistant zinc coatings by ce-
ntation has been improved by
e addition of large quantities of
mina to the zinc dust used in
e process.

Vitreous enamels: Virtually un-
ed for wear resistance, they have
operties which offer interesting
ar possibilities.

Upgraded babbitt: Look for
w high speed alloys with the
ructural characteristics of bab-
t. They are getting a tryout as
ll retainers in high-speed air-
aft bearings.

Sulphur case: A recent French development uses a salt bath to penetrate steel surfaces with sulphur compounds. It's supposed to impart good high-temperature wear qualities.

Solid lubricants: Graphite and molybdenum sulphides incorporated in a resin base and baked on the surface of small parts give excellent protection against wear from oscillating motion. One present use: Seat slides in aircraft.

Sea of air: When electric motor brushes in World War II aircraft failed catastrophically at high altitude, a lot of people were surprised to learn that dryness was the culprit. Look for new revelations on the important role of water vapor in wear resistance.

Extremes: One company has gone to opposite ends of the hardness range — alumina against graphite—for rotating seals.

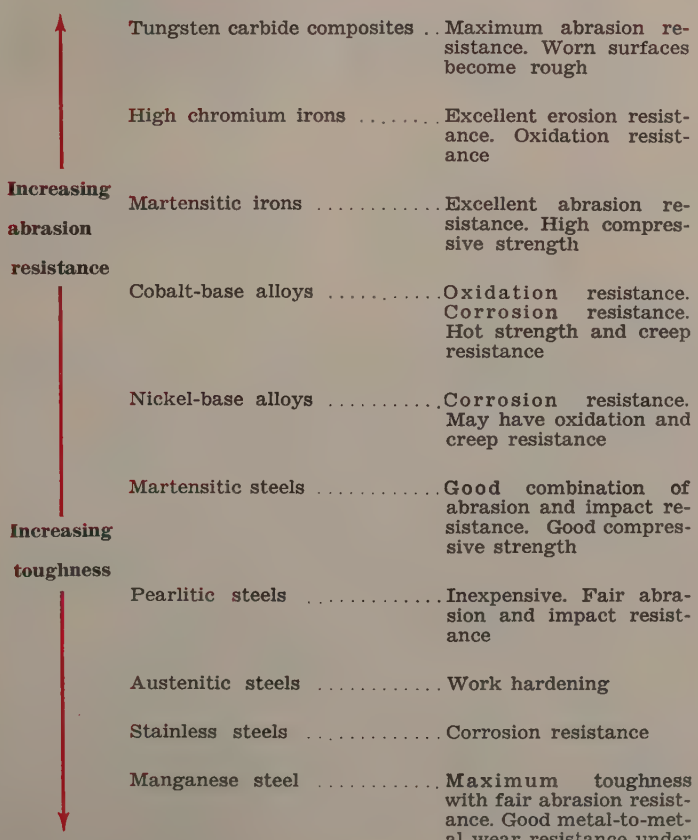
Bearings: Aluminum is the metal to watch for turbine and internal combustion engine bearings. Lower leaded bronzes are also showing promise for better service at higher temperatures and with problem-creating synthetic lubricants.

Nature of the beast: There's a world of room for improvement—and it's coming—in basic wear theory. A recent GM contribution relates bearing qualities to difference in atom sizes. A good bearing has atoms enough bigger or smaller than the journal atoms so that few atomic junctions can be formed.

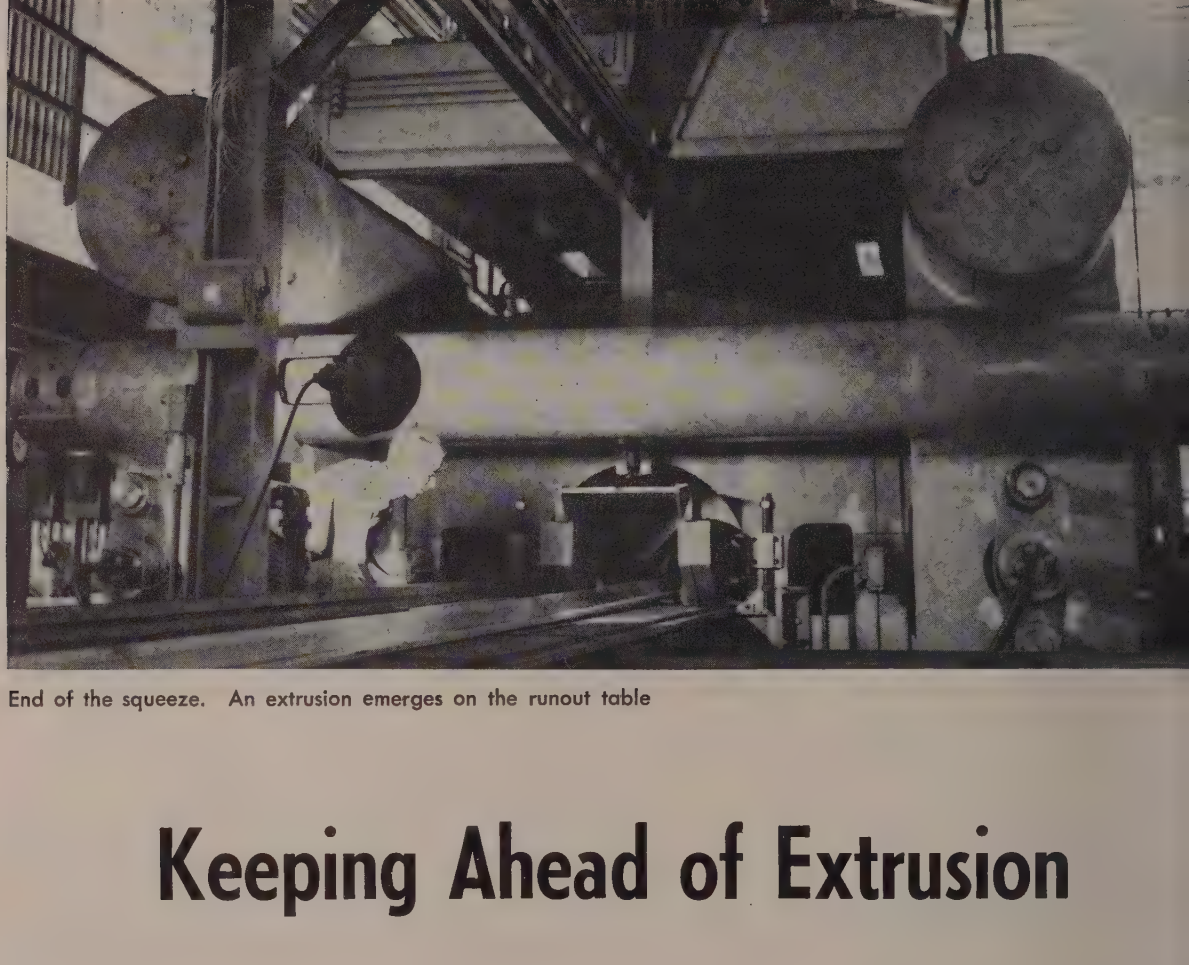
Wear words: When people can agree on exactly what is meant by terms such as "galling," "fretting" and "scuffing" we'll be a lot closer to solving some basic wear problems.

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

Alloys for Impact and Abrasion Resistance


Increasing abrasion resistance
Increasing toughness
Tungsten carbide composites . . Maximum abrasion resistance. Worn surfaces become rough
High chromium irons . . . . . Excellent erosion resistance. Oxidation resistance
Martensitic irons . . . . . Excellent abrasion resistance. High compressive strength
Cobalt-base alloys . . . . . Oxidation resistance. Corrosion resistance. Hot strength and creep resistance
Nickel-base alloys . . . . . Corrosion resistance. May have oxidation and creep resistance
Martensitic steels . . . . . Good combination of abrasion and impact resistance. Good compressive strength
Pearlitic steels . . . . . Inexpensive. Fair abrasion and impact resistance
Austenitic steels . . . . . Work hardening
Stainless steels . . . . . Corrosion resistance
Manganese steel . . . . . Maximum toughness with fair abrasion resistance. Good metal-to-metal wear resistance under impact.

Source: American Brake Shoe Co.



End of the squeeze. An extrusion emerges on the runout table

Keeping Ahead of Extrusion

YOU RUN just to keep up in the aluminum extrusion business. The growth statistics of the industry (right) give the big picture. For the close-up view, see what's happening at Halethorpe, Md.

Kaiser Aluminum & Chemical Corp. has just completed a $25-million addition to its extrusion plant. It was financed by the Air Force and is operated under a five-year lease. Already under way is a $6.5-million second addition, scheduled for completion in December, 1956.

Rex and Regina—The plant addition went into production Nov. 2. Its first extrusion (a 14-ft wing section for the military) was squeezed out on an 8100-ton press.

The big press and its twin, dubbed Rex and Regina, stand side by side in the main bay of the 340,000-sq-ft plant. Their work was cut out for them long before they were installed.

One aircraft company wants 5-million lb of extrusions, but the Air Force has first priority for 1.5-million lb. With press capacity of up to 2-million lb a month (depending on section and alloy), Kaiser hopes that eventually it'll be able to work in some capacity for civilian products.

Busters—The twin presses, designed by Loewy-Hydropress, are 126 ft long, with 130-ft runout tables. Each weighs 1500 tons. They will handle billets up to 26 in. in diameter and 58 in. long. Finished extrusions will weigh up to 1400 lb.

Billets are preheated by induction, and temperature is maintained in the presses by resistance heaters with a range of 1500°F. Maximum speed of the stroke is 50 fpm at 24 cycles an hour (Kaiser plans to operate the presses at 15 to 20 cycles per hour).

The squeeze comes from three cylinders. The two main o exert a load of 5400 tons and central mandrel cylinder adds other 2700 tons of thrust. So idea of the cost of the presses be gathered from the $40,000 placement cost of one tierod (e press has four, 76 ft long 20½-in. in diameter).

What It Takes — To keep presses in full production, the a die shop, a laboratory for c tinuous testing and this prod tion equipment:

Each of the four reverberat furnaces has melting hearths w a capacity of 50,000 lb, and h ing hearths with a capacity 30,000 lb. These furnaces can m 15,000 lb of metal every hour.

Two billet casters are capable producing billets up to 25 ft lo with diameters ranging from 12 20 in. Each casting station produce from two to four bil per operation, depending u

r diameters.
our car-type homogenizing fur-
s, each with a capacity of 100,-
lb, are equipped with six log
and one transfer car for load-
and discharging.
wo billet saws and conveyors
zing saw blades 48 in. in diam-
are capable of cutting billets
n. in diameter in 35 seconds.
billet coring machine has a
ge of 8 to 20 in. for inside di-
ters on billets with outside di-
ters of 15 to 29 in. It can
dle billets between 15 and 52
n length and up to 3100 lb.
x induction billet heaters have
pacity of 4000 lb per hour in
ts from 12 to 20 in. in diam-
and 60 in. long, heated to a
perature of 800°F.
vertical heat treat furnace has
pacity of 10,000 lb per load
is capable of handling pieces
o 50 ft in length.
horizontal roller hearth heat
furnace has a capacity of
lb per hour in a continuous
ess and is able to handle
es up to 90 ft long. Quick
ch is applied by nozzle sprays
ble of emitting 25,000 to 30,-
gpm of water.
n age and anneal oven has a
city of 100,000 lb at 800°F in
urs.
roll straightening-roll con-
correcting machine is capable
andling pieces up to 85 ft long.
horizontal straightening gag

Watch Aluminum Extrusion Grow

	Number of extruders	Extruded shapes, tube blooms, tubing
1955	104	300,000 tons*
1954	93	256,650
1953		231,199
1952		173,771
1951		156,472
1950	30	129,038
1949	19	74,998
1948		85,972
1947	8	* estimated

press is capable of handling pieces from 30 in. to 85 ft long with diameters that can be inscribed within a 24-in. circle.

A hydraulic stretcher-detwister is capable of handling pieces up to 90 ft long with diameters that can be inscribed within a 24-in. circle.

A detwister capable of exerting 3-million inch pounds of pressure can handle pieces up to 85 ft long with diameters that can be inscribed within a 24-in. circle.

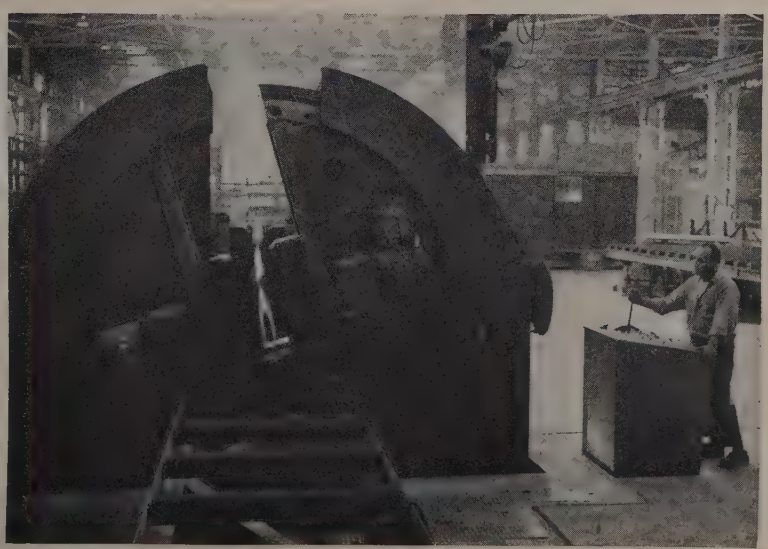
Power — The hydraulic system powering the presses has 14 bottles of 2400 gallon capacity (ten air, four air and water) and a suction tank with a capacity of 12,000 gallons. The system will operate both presses simultaneously on a 24-cycle-per-hour basis.

At peak production, the plant is expected to use 1.8-million kw-hr of electricity and 35-million cu ft of gas per month.

Plus—All this is in addition to Kaiser's older next-door plant, which houses one 4400-ton Southwark press, two 2500-ton Schloemann presses, one 1600-ton press and a 500-ton baby for experimental purposes. These presses have circular chambers, but the new presses are designed for rectangular chambers when they are needed.

Expansion planned for 1956 will add three 2750-ton presses and one 3500-ton tubing press. They are expected to jump extrusion capacity to about 6 million lb a month.

ving 7000-lb billet from casting station



This detwister will deliver up to 3-million inch pounds of pressure

MACHINE TOPICS

By R. F. HUBER, *Machine Tool Editor*

WHEN THE Department of Defense halted its layaway machine tool program, it did more than withdraw a hatful of machine tool business. It hinted that its basic thinking on preparedness has changed.

The original plan made good sense: Purchase long-lead-time machines so the services can throw modern equipment into production in an emergency. That's the kind of readiness the Vance Plan advocates.

Now, under the label of a Washington economy drive, it looks as if common sense is being questioned. The program will be held up indefinitely, pending review by top Pentagon officials. One stumbling block, they say: There have been such tremendous changes in weapons and machine tools that many machines bought now would be obsolete in a few years.

Choice — This, admittedly, is a whale of a problem to the services. There probably is no perfect solution. The question is: Is it better to buy now, risking that the equipment will be partially obsolete when it's needed? Or is it better to wait till it's needed and then buy?

Remember, they're talking about machines that take 18 months to build. In an emergency, 18 months may be too long. The choice is between *having* a partially obsolete machine, or having nothing but a signed order blank.

Despite Washington insistence that this isn't related to the Vance Plan, it's a good bet the same philosophy (or whatever it is called) will be applied to other reserve facilities.

Future? — A Washington spokesman told STEEL he is betting the program will get back in action before next June, but at a greatly reduced rate.

Slow, at Best

It is probably true that the loss of business to the machine tool industry won't be so large as the figures imply.

The Air Force got $85 million of the fiscal 1955 appropriations ($100 million). Only about $15 million has been obligated. The $100 million appropriated for the current fiscal year hasn't even been assigned.

Under the Wire — The last contract to be let by the Air Force under the program was for $3 million. It went to King Machine Tool Co., Cincinnati. The biggest spending spree took place last spring (STEEL, June 27, p. 43). It was for $11.2 million.

Apparent reason for the delay: High-level lethargy in the Defense department. With little enthusiasm at the top, lieutenants dragged their feet, took months to decide what they wanted to buy.

$64,000 Questions

Review by top officials also will ask these questions:

Should machine tool packages being held for an item that's now obsolete be broken up and reassigned to a current project?

Should reserve equipment be stored, or installed on current or stand-by lines?

Should tooling be purchased in the prototype stages, or when the item is ordered for production?

Radiation Testing

GAMMA RAYS are testing
in large, complicated alloy
castings (pipes, valves, etc.) a
tional Supply Co. The sourc
balt-60, penetrates up to 2½-
steel.

Metallurgists at the Toled
plant are happy about the r
they're getting (they used to
chase testing services) and
easy cobalt-60 is to use. All
ators need to do is position
welded parts and move a 9-in.
sphere. The savings in m
costs have more than justifie
switch.

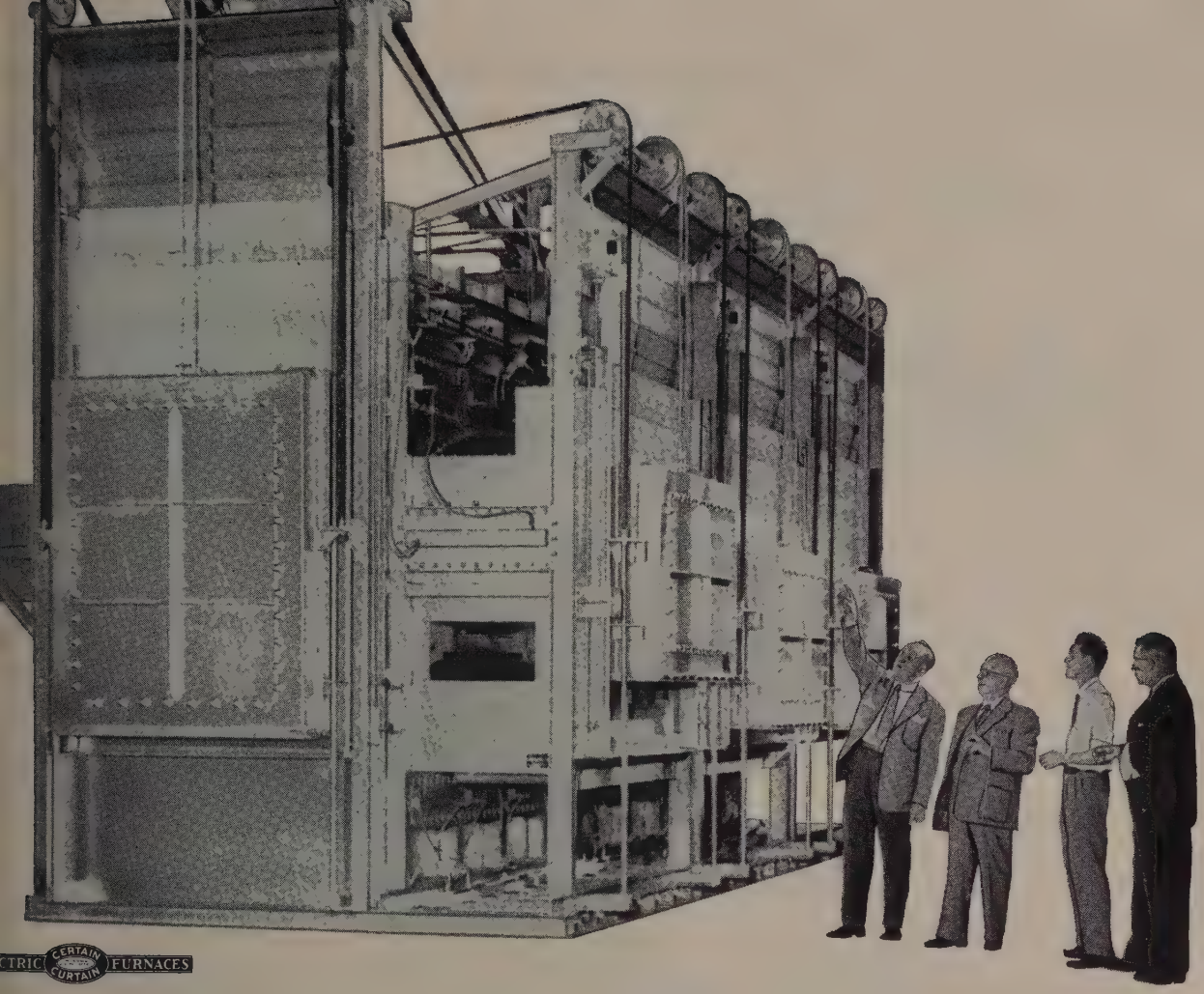
Handling — Operators do
stuff inside a room with 1
thick concrete walls. A 7-foot
is equipped with a releasing m
to handle a ⅛-in. capsule that
tains the radioactive cobalt.
ing the cobalt, length of expo
film, etc., follow the usual
niques.

Preparation — X-ray fil
wrapped around the outsid
taped to one side of a weld
metal numbers placed to ide
the film position and locatio
defects. Small, perforated
blanks (called "penetromete
2 per cent as thick as the weld
placed next to the weld. The
show up as dark spots on th
veloped film and serve as a
parison for other dark spots
may be defects in the weld. Op
paper protects the film ag
light.

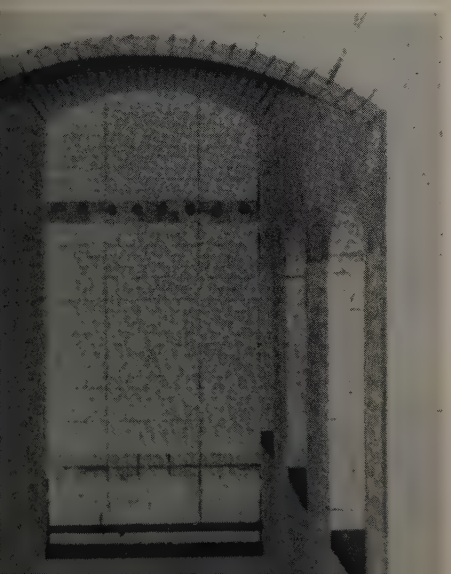
The cobalt-60 is then place
that the rays penetrate the
for periods from 20 minutes
hours depending on the exp
desired.

Getting Some — STEEL's ar
"Atoms Mean Business," (Oct
p. 66) will help you find so
and useful information about
testing with radioactive mate

The weld under the white-taped
film is tested by the ⅛-in. cube
balt-60 on the end of the rod



nterior of heating chamber. It will accommodate 10,000-b. steel forgings. The GLOBAR heating units and the CARBOFRAX hearth and piers had not yet been installed when this photo was taken.



SUPER REFRACTORIES REDUCE WEIGHT AND GIVE FAST HEAT-UP OF

orld's largest electric steel forging furnace

The world's largest controlled atmosphere electric steel forging furnace was recently shipped from the Cranston, R. I. plant of C. I. Hayes, Inc. The big furnace is 17 feet high, 13 feet wide and 25 feet long over-all. It uses 45 GLOBAR® silicon carbide heating elements drawing 600 kilowatts to provide operating temperatures in the 2200°-to-2400°F. range. It will be used to supply billets up to 16 feet in length and 10,000 lbs. in weight for hot forging on a 50,000-ton press, one of the largest in existence.

C. I. Hayes used a carefully-worked-out combination of CARBORUNDUM Super Refractories to keep weight low and cut heat absorption of the lining to a minimum with greatest possible service life under working conditions:

A CARBOFRAX® silicon carbide hearth provides high thermal conductivity, abrasion-resistance, and load-carrying ability at the 2300°F. work chamber temperature.

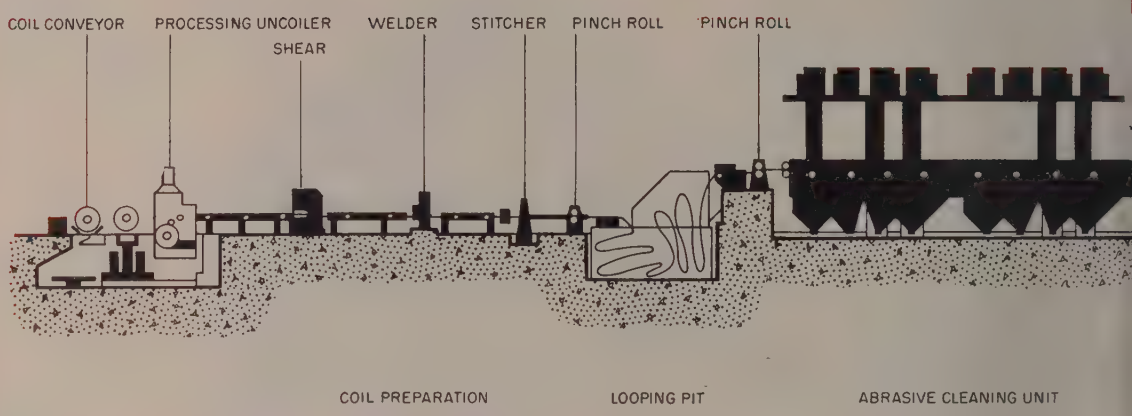
CARBOFRAX piers have so much hot strength that they can be light and slender yet still furnish adequate support for the heavy furnace charges.

MULLFRAX® W electric furnace mullite skews are nonspalling and provide excellent load-carrying strength at high temperatures, with low heat conductivity.

ALFRAX® BI aluminum oxide brick are used for the sidewalls and roof. One of the most effective of all insulating materials for very high temperatures, these ALFRAX materials keep heat costs down; are light in weight, nonspalling and highly refractory.

This arrangement of CARBORUNDUM refractory materials gives the big furnace low heat storage and fast heating . . . is economical to operate and maintain. These Super Refractories can improve your furnaces in the same way. Why not check up on them now? Write Refractories Division, The Carborundum Company, Perth Amboy, N. J., Dept. W115.

CARBORUNDUM



Abrasive Blasts Scale fr

By GILBERT D. DILL
Engineer in Charge of Steel Division
Wheelabrator Corp.
Mishawaka, Ind.

WILL BLAST DESCALING spell the end of the pickling line?

Empire Steel Corp., Mansfield, O., is cleaning hot-rolled carbon steel strip by mechanical blast descaling and a short flash-pickle.

Exit end of the mechanical descaler. Ductwork at top leads to dust collector located outside the building

A First—While mechanical descaling of steel is not new, this is the first time it has been used to clean carbon steel strip in a producing mill. The descaler, built by Wheelabrator Corp., is the largest machine of its kind.

The cleaning line has adequate capacity to keep pace with the Bliss 4-stand, 4-high tandem cold mill, although the production of the descaler is limited only by the speed of the mechanical processing and handling equipment ahead of it.

Production—The line is cleaning strip ranging from 24 to 44 in. wide and 0.075 to 0.201 in. thick at the rate of 250 fpm (the speed requirement in this mill operation).

The Wheelabrator mechanical descaling section is 66 ft long. The flash-pickling section which follows is only 60 ft long.

A straight pickle installation would require about 250 ft of space for the production attained. Space saving here: Over 75 per cent.

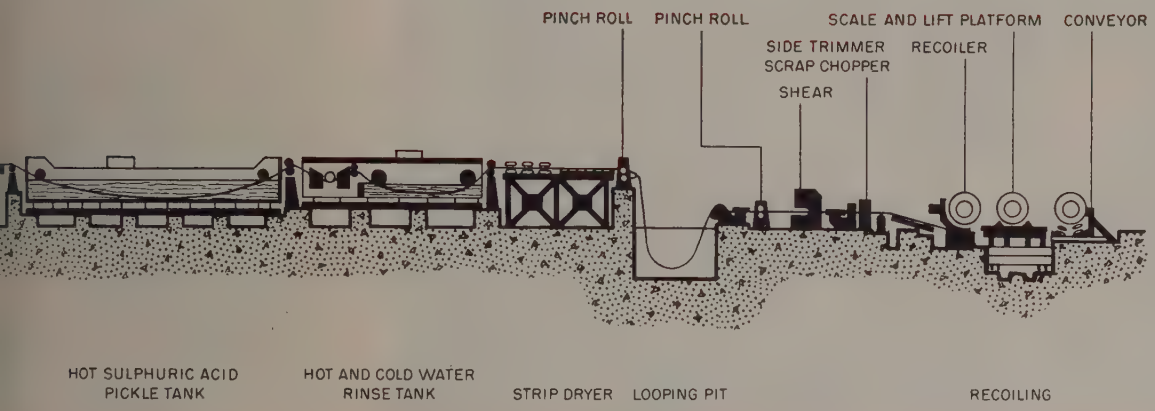
Cleaning—Descaling is ha
by 16 Wheelabrator wheels,
of which throws 1000 lb of
shot against the strip as it p
through the enclosed ca
Eight tons of abrasive (no
particle size, 0.017 in.) scou
strip each minute.

Eight throwing wheels a
the strip blast abrasive downw
Eight wheels below the strip
upward. All wheels are ad
able so that both sides of
width strip up to 44 in. ca
cleaned simultaneously as it p
through the cabinet.

Shot Reclaimed — Blowoff
tions remove the shot from
strip leaving the cabinet, so
sive is not carried out and los

When the abrasive is worn
size where it is no longer prac
for re-use, it is separated fron
circulating system so that it
be reclaimed for other uses by
tering, briquetting or similar
essing.

Flash-Pickling — As the
leaves the Wheelabrator, it p



arbon Strip

rough the flash-pickling tank hich is equipped with rubber-cov-ed depressor rolls that submit ie strip to 55 ft of acid contact. his means the strip is in the acid out 13 seconds. Build-up of on in the acid bath has been sub-ormal.

Line Components—The complete eaning line is 525 ft long. At ie entrance of the line are a ale-breaking McKay processor ith a five-roll leveler, a squaring id cropping shear, a Morton butt elder and trimmer and a Wean echanical stitcher. The welder ins three 8000-lb coils from the ot mill to make one 24,000-lb coil r the cold mill. The stitcher is sed when a weld is not desired.

A space of 77 ft between the de-aler and the acid tank is re-rved for future capacity.

To permit the descaler to op-rate continuously, looping pits re provided in the line for stor-g strip. One of these precedes ie Wheelabrator and one follows ie cleaning operation.

Operating Speeds—The head section of the line operates at about 600 fpm, so that sufficient material can be stored to keep the cleaning section operating at 250 fpm while a weld or stitch is being made.

Time for shearing out stitches at the end of the line, to break the coils into individual units, is gained similarly. The sides of the head-end looping pit are adjustable, so that various widths of strip can be held in line to prevent twisting or misalignment.

A Wheelabrator Dustube collector of the cloth-tube-type ventilates the blasting equipment to prevent dust from accumulating in the working areas. It filters 23,000 cu ft of air a minute.

Trend in Design—Mechanical descaling equipment which will handle larger stock at faster production speeds is being designed. Each throwing wheel of a given size has a known cleaning rate for a particular application. Wheelabrator sees no practical limit to the number of wheels that can be combined.

Empire Steel's strip cleaning line was designed by Wean Engineering Co. Inc., Warren, O.

How Mechanical Descaling Stacks Up

After several months of production experience with the process, Empire Steel reports:

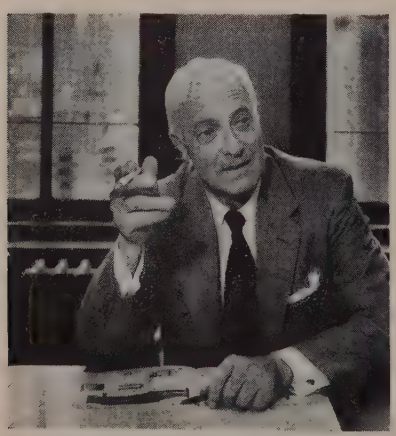
1. **Strip is flash-pickled in 16 per cent acid at 200°F in only a 13-second immersion. This compares with about 60 seconds of immersion for a normal, straight pickle line.**
2. **Strip is exceptionally clean and free of smut, has a good white color and is giving excellent results in the cold mill.**
3. **Etched finish produced by the descaler makes it easy to reduce the stock in the cold mill.**
4. **Steel is saved because practically none of the virgin metal is removed. It's possible to recover all the scale.**
5. **There is evidence that cleaning costs will be substantially below that of pickling.**

• *Extra copies of this article are available in quantities from one to three until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

(Advertisement)

How Do Lightweight Refractories Cut Fuel Costs And Boost Furnace Output?

Here, certainly, is a timely question. There's a heavy squeeze today on most furnace operators for lower costs, larger production . . . or both. And despite all the economies they've put into effect so far, they're still searching hard for ways to make their furnace dollars do a bigger job.



The following discussion brings out a number of facts, often overlooked, about the money-saving, profit-building potentials inherent in *lightweight* insulating firebrick.

Q. *First of all, just what do you mean by "lightweight" insulating firebrick?*

A. Compared with dense, fireclay brick weighing approximately 7½ to 8½ pounds each, insulating firebrick range from about 3½ pounds down to slightly over 1 pound for various temperature requirements.

Q. *What does this light weight have to do with lower production costs?*

A. Briefly, heavy furnace linings waste your fuel dollars two ways:

They soak up and store large quantities of heat which are lost when the furnace is cooled; and they conduct and lose too much heat through the wall.

Lightweight insulating firebrick, on the other hand, contain millions of tiny air cells, heat up and cool quickly, absorbing and storing very little heat. Also, they resist heat flow, keeping it inside the furnace to do productive work.

Q. *I can see why you would save on fuel — but how much?*

A. There's no single answer to that question—there are too many variables to be considered. But to give you an idea of these savings, here are a f actual examples:

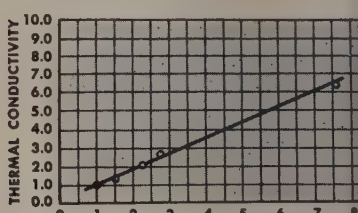
The operator of a large forge furna cut his fuel costs more than 50% af changing to *lightweight* insulating fi brick.

A manufacturer of electric kilns sta that insulating firebrick result in h savings of fully 25%.

A magnesium melting crucible furna that formerly used 1,000,000 BTU per hour now does the same job w 500,000 BTU's, thanks to insulati firebrick.

Q. *Increased production has also be pointed out as an advantage of insul ing firebrick. How do you explain th*

A. Again the answer lies in lightn of weight. Because lightweight firebr store and conduct less heat, they co up to operating temperature faster cool down faster, too. This means shorter heating cycles.



Relation between weight and thermal conductivity for several brands of kaolin base refractories. (mean temperature, 900F)

Secondly, because lightweight firebr conduct far less heat than heavy, de firebrick, you don't have to build thick a wall. This gives you more hea area per square foot of floor space.

Thirdly, lightweight firebrick respo more rapidly to changes in furnace h input, which means closer temperat control and fewer rejects in ma instances.

It's just like adding extra furnace cap ity without adding to your furna investment.

Q. *Are there any differences in the p formance of the various brands of in lating firebrick available?*

A. Naturally, the *lighter* the brick t greater the fuel savings and furnace o put. And the lightest insulating fi brick of all, for any temperature ran — if you'll pardon our mentioning it are B&W Insulating Firebrick.

THE BABCOCK & WILCOX C
Refractories Division
General Offices:
161 East 42nd St., New York 17, N. Y
Works: Augusta, Ga.

Heat Treating Ductile Iron

PART II

By DR. ROBERT E. SAVAGE
Metallurgist, Development & Research Division
International Nickel Co. Inc.
New York

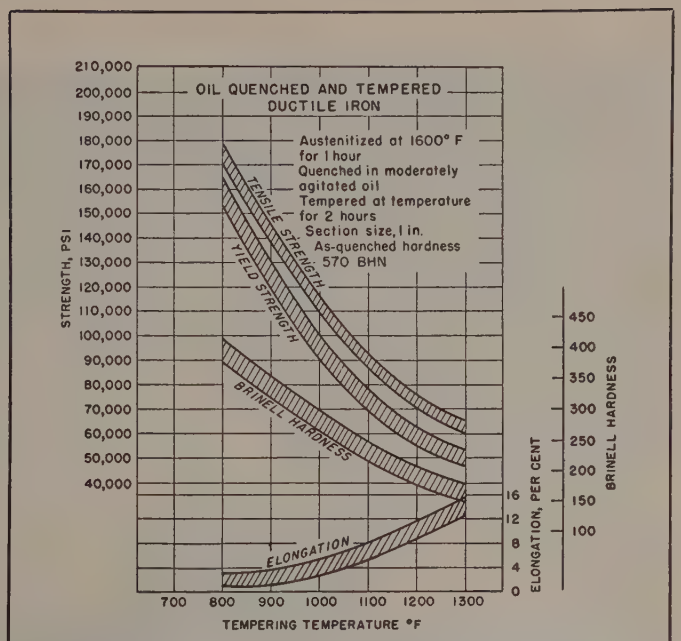


Fig. 3. Influence of tempering temperature on mechanical properties of oil quenched and tempered ductile iron

EAT TREATING is the key to uctile iron's great range of me-anical properties.

Last week (STEEL, Nov. 21, 108) stress relief and annealing ere covered. This article will al with hardening treatments—rmalizing, quenching and mar-mpering, all followed by temper-g; and induction and flame sur-ce hardening.

Normalize and Temper — This eatment consists of: 1. Heating to the austenitizing temperature nge so some of the carbon will into solution. 2. Cooling in air room temperature to form earlite. 3. Tempering below the wer critical temperature to elim-ate cooling stresses and to get e desired hardness.

Factors influencing this treat-ent are chemical composition, ction size, prior austenitizing mperature and velocity and tem-rature of the air.

Typical properties are: Tensile rength, 100,000 to 120,000 psi; eld strength, 70,000 to 90,000 i; elongation, 3 to 10 per cent 2 in.; Brinell hardness, 240 to 0; Charpy impact, unnotched, to 50 ft-lb.

Alloying elements, such as nickel d molybdenum, must be added to get these properties when casting heavy sections.

Cooling—Rate of cooling in air is the controlling factor in producing normalized properties.

Castings must be placed so air may circulate freely around them. They will not respond to a normalizing treatment if they are left to cool in the annealing pot.

Procedure—Heat the casting to 1600-1700° F and hold for 1 hour, plus 1 additional hour for each inch of controlling section size. Remove from the furnace, cool in air and temper for 1 hour, plus 1 additional hour for each inch of section. The tempering tempera-

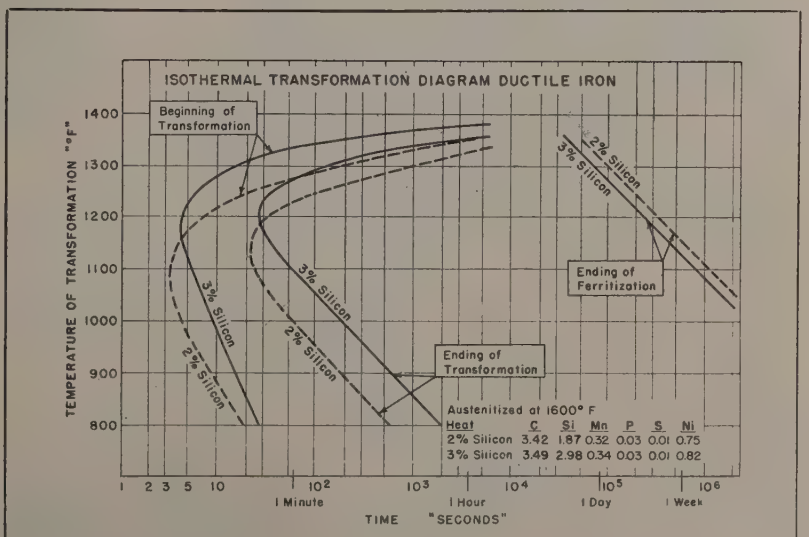
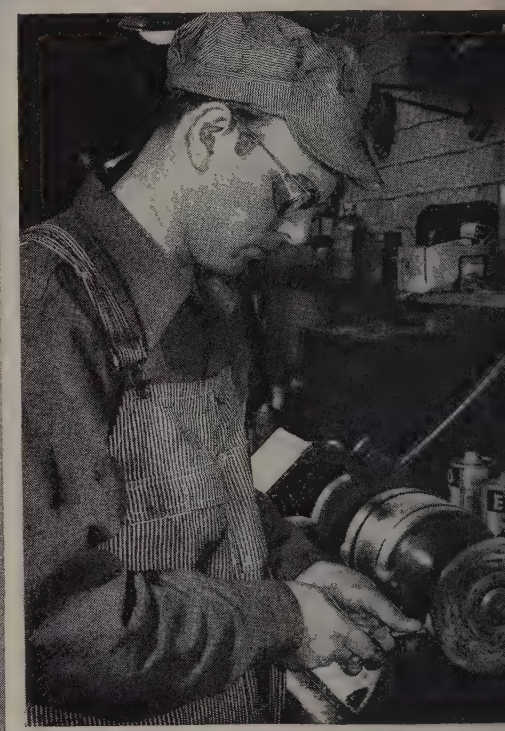


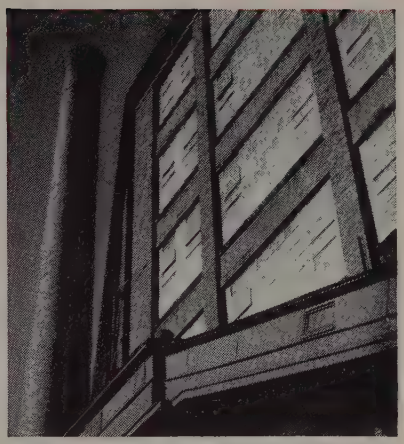
Fig. 5. Isothermal transformation diagrams for two heats



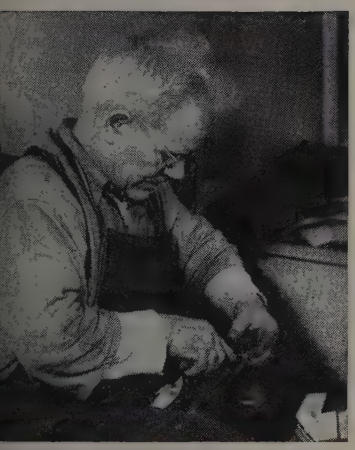
BRUSH OFF. Power brushes for polishin deburring and rough metal finishing u CF&I-Wickwire Brush Wire.

HIGH FASHION FASTENERS. This eye-catchi gown has hook and eye fasteners made CF&I-Wickwire Hook and Eye Wire f secure, inconspicuous closures.

om dressing up a beautiful lady...
dressing down a metal casting...
othing has so many uses as wire!

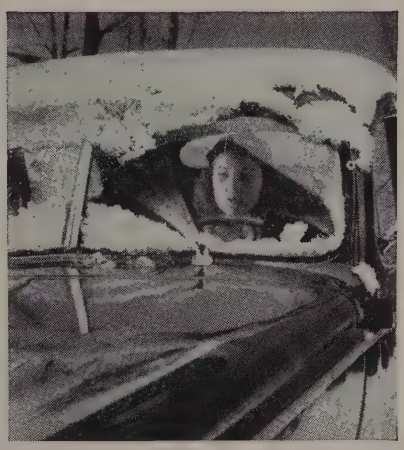


NO SHATTERED WINDOWS in this factory. The hex mesh netting for plate glass reinforcement is made of annealed CF&I-Wickwire Glass Netting Wire.



E SUPPORT. Millions of nails—from shoer's tacks to heavy spikes—are used anly by scores of industries. Nails are made n CF&I-Wickwire Industrial Quality Basic e.

PIN-UP has been a snap for mothers ever since the invention of the safety pin. Today, millions of these indispensable fasteners are made from CF&I-Wickwire Safety Pin Wire.



FOR DRIVING SAFETY. This windshield wiper is operated by dependable, high tensile strength CF&I-Wickwire Cord Wire.

Everybody knows that steel is indispensable to today's manufacturer, today's living . . . yet few people realize that wire is the most widely applicable, the most versatile form in which steel is used. Here's the reason — wire lends itself to thousands of extremely diversified applications. Strength? Wire has it. Ductility? Wire is the first thing you think of. Good looks? Wire can be plated and finished in many attractive ways. On every score, nothing offers so many useful and variable properties as wire.

Whatever you make, process, or assemble, you'll find that CF&I-Wickwire Wire fits into the picture to perfection. We have the experience and the facilities to provide exactly the wires you need from plants conveniently located from coast to coast. Write our nearest sales office for complete details.

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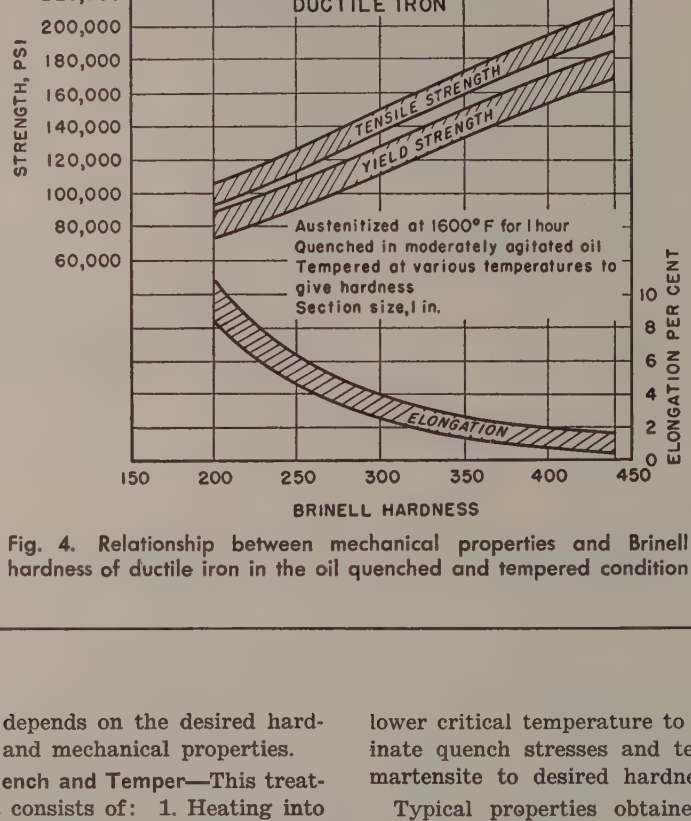

Fig. 4. Relationship between mechanical properties and Brinell hardness of ductile iron in the oil quenched and tempered condition

ture depends on the desired hardness and mechanical properties.

Quench and Temper—This treatment consists of: 1. Heating into the austenitizing temperature range to get the carbon into solution. 2. Quenching in a liquid to form martensite or intermediate products. 3. Tempering below the lower critical temperature to eliminate quench stresses and temper martensite to desired hardness.

Typical properties obtained by quench and temper are: Tensile strength, 120,000 to 150,000 psi; yield strength, 90,000 to 125,000 psi; elongation, 2 to 7 per cent in 2 in.; Brinell hardness, 270 to 350;

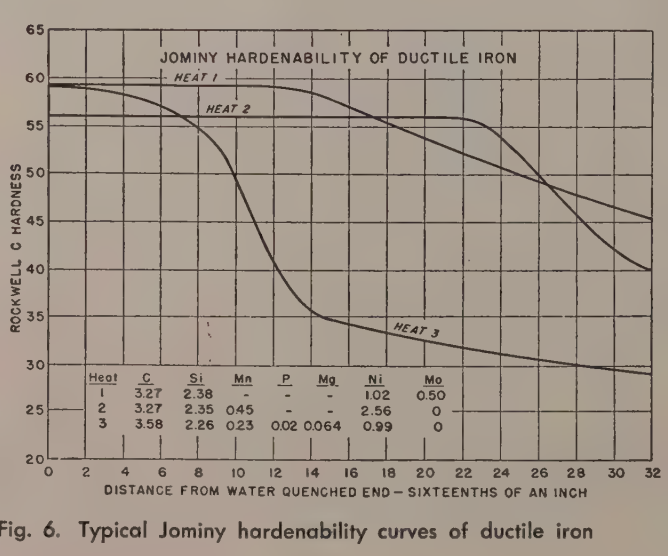

Fig. 6. Typical Jominy hardenability curves of ductile iron

Charpy impact, unnotched, 25 40 ft-lb.

Temperature — Austenitiz temperatures of 1550 to 1700 normally produce the highest quenched hardness. Hold the ca ing at temperature for 1 ho plus 1 additional hour for e inch of section. To reduce the verity of the quench, it is of desirable to cool to 1550° F bef quenching.

Parts may be quenched in water or salt baths. Oil is m common since it minimizes quenched stresses. The cast will have its highest Brinell ha ness after quenching.

Tempering — Parts should tempered for 1 hour, plus 1 ad tional hour for each inch of s tion size at a temperature wh will give the desired hardness mechanical properties (Fig. 3).

In both normalized and tempe and quenched and tempered d tile iron, a definite relations exists between the tensile streng yield strength and elongati versus the Brinell hardness nu ber. By knowing the Brinell ha ness, mechanical properties m be predicted. The ratio of ten strength to Brinell hardness about 475:1 for both treatme

Fig. 4 shows this relations for quenched and tempered ca ings. To obtain these proper in heavy sections, additional all ing elements, such as nickel or m lybdenum, must be added.

Martempering — This treatm is used for hardening when m mum distortion is required. Par isothermal transformation grams for two compositions ductile iron are shown in Fig. Such diagrams are helpful in lecting times and temperatures martempering dutile iron castin

Martempering consists of he ing into the austenitizing ra for 1 hour, plus 1 additional h for each inch of section thickn Then parts are quenched in a s bath at some intermediate temp ature and held for sufficient ti to transform part of the auste to intermediate products.

Cool and Temper—Cool the ca ing to room temperature. Tem for 1 hour, plus 1 additional h for each inch of section at the s

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Designed for gas mains from 36" to 120", the Bailey Thermal Expansion type goggle valve operates by the linear expansion and contraction of three sets of steel tubes. When steam is applied, the tubes expand and separate the flanges, thereby freeing the goggle plate for swinging to open or closed position. When steam is removed, normal cooling contracts the tubes, which then clamp the flanges together to form a gas-tight leakproof seal. Can be hand-operated in case of steam failure.

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ENGINEERS

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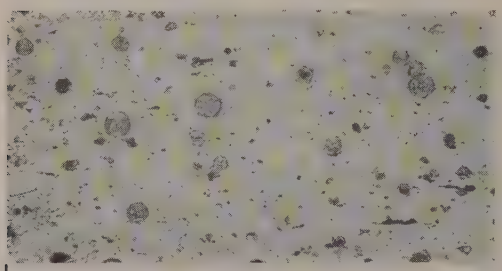
bath temperature or slightly lower.

The hardness developed will depend on the chemical composition, section size of the casting, temperature of the salt bath and time of holding. Rockwell C hardnesses of 40 to 50 are obtained easily by this treatment. Ductile iron has good hardenability characteristics which are due to the availability of the carbon for hardening the matrix structure.

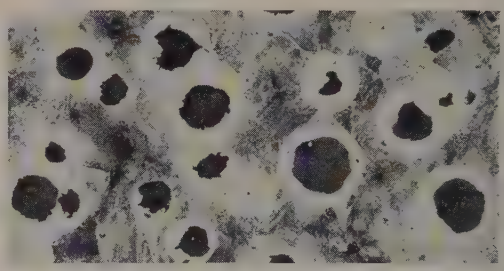
Surface Hardening—It is sometimes desirable to surface harden ductile iron to provide a hard case having up to Rockwell C 60 hardness but retain good ductility a impact resistance in the core. T processes: Induction and fla hardening are used.

Induction—The matrix of d tile iron should be predominant pearlitic prior to induction har ening. Types 80-60-03 and 1

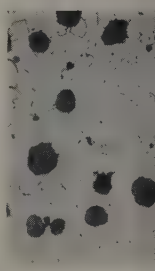
TYPICAL MICROSTRUCTURES



As-cast, light section



As-cast, moderate to heavy section



Annealed

HEAT TREAT

TYPICAL MECHANICAL PROPERTIES

Heat Treatment	ASTM type	Tensile Strength (psi)	Yield Strength (psi)	Elongation (per cent)	Hardness	Charpy Impa Unnotched (ft lb)
As-cast, light section	....	.....	.....	.....	.....	.....
As-cast, moderate to heavy section	80–60–03	80,000–100,000	60,000–75,000	3–10	200–270 Brinell	15–65
Stress relief	....	.....	.....	.....	.....	.....
Softening Treatment						
Anneal	60–45–10	60,000–80,000	45,000–60,000	10–25	140–200 Brinell	60–115
Hardening Treatments						
Normalize & temper	100–70–03	100,000–120,000	70,000–90,000	3–10	240–300 Brinell	35–50
Quench & temper	120–90–02	120,000–150,000	90,000–125,000	2–7	270–350 Brinell	25–40
Martemper & temper	....	.....	.....	.....	40–50 Rockwell C	.....
Surface Treatments						
Flame hardening	....	.....	.....	.....	Up to 60 Rockwell C	.....
Induction hardening	....	.....	.....	.....	Up to 60 Rockwell C	.....

)3 respond well. Normalized tempered or stress relieved tings are preferable.

Using stress-free castings, with predominantly pearlitic matrix, uction heating time is held to ninimum. This minimizes the sibility of cracking.

Procedure — Bring the surface to the austenitizing temperature quickly by induction heating. Then cool the surface in air or liquid quench. A martensitic structure is produced.

The casting should be tempered after hardening to minimize stresses caused by the process.

Flame—Ductile iron responds in a similar manner to flame hardening. The treatments for induction hardening are applicable.

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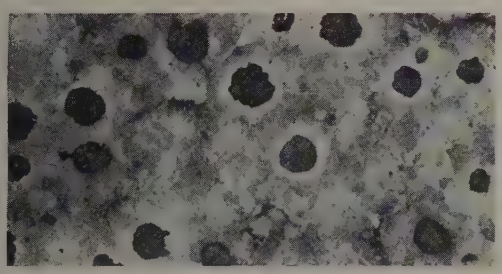
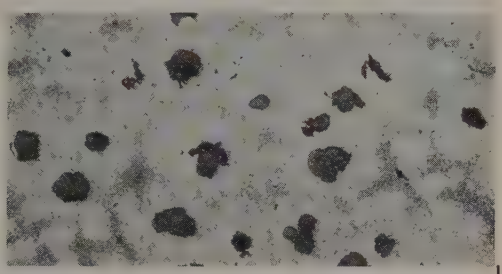


Normalized and tempered



Quenched and tempered

CTILE IRON

cal Heat Treatment Cycle*	Characteristics	Typical Applications
	Low mechanical properties due to carbidic structure usually present in light sections (under ¼-in.). Excellent wear resistance but low impact resistance. Easily heat treated	Rolls, plow points, applications requiring a chilled surface
	Essentially pearlitic matrix in moderate sections (¼ to ¾-in.) giving higher tensile strength and hardness. Ferrite increases in sections over ¾-in., giving lower tensile strengths and hardnesses. Pearlite stabilizing alloys must be added if pearlite is desired in heavy sections. Good machinability and toughness. Responds readily to flame or induction hardening	Wear and strength applications for automotive, aeronautical, diesel, agricultural, heavy machinery, mining, paper, textile and other related industries. Gears, crankshafts, bases, crowns, etc.
to 1000–1250° F and hold 1 hour, furcool to 700° F, then cool at any rate oom temperature	Microstructures similar to as-cast material. At higher stress relief temperatures, more ferrite forms. All as-cast castings should be stress relieved if complex engineering castings	Same as as-cast ductile iron
Heat to 1650° F and hold 1 hour, cool to 1275° F and hold 5 hours, furnace or slow cool to room temperature Heat to 1650° F and hold 1 hour, furnace cool to 1200° F controlling cooling rate between 1450 and 1200° F to maximum of 35° F per hour, furnace or slow cool to room temperature If no carbides are in as-cast microstructure, heat to 1300° F and hold 5 hours, furnace cool to 1100° F, slow cool to room temperature	Essentially ferritic matrix. Pearlite stabilizing elements should be held to a minimum. Maximum machinability and toughness. Most weldable type. Not readily flame or induction hardened	Pressure castings, valve and pump bodies, compressor heads, pipe, fittings, shock resistant parts for automotive, agricultural, electrical, railroad, machine, marine and general use, such as gear housings, levers, motor frames, etc.
to 1650° F and hold for 1 hour, cool ir to room temperature. Temper to dehardness	Essentially pearlitic matrix. Combination of strength, toughness and wear resistance. Pearlite stabilizing alloys must be added to obtain these mechanical properties in heavy sections. Readily flame or induction hardened	Gears, crankshafts, camshafts, pistons, agricultural implement parts such as bolsters, bolster forks, ratchets, governor weights, track shoes, reactor brake drums
to 1550–1600° F and hold for 1 hour, ch in oil. Temper to desired hardness	Alloys imparting hardenability (nickel, molybdenum, etc.) must be added to obtain adequate hardenability in heavy sections. Readily flame or induction hardened	Pinions, gears, cams, dies, machine guides, track rollers, idlers, tractor steering, gear arms, drill press columns, pump liners, clutch drums
to 1600° F and hold for 1 hour, ch in salt bath at intermediate temture to desired hardness. Cool to room perature. Temper at or slightly below bath temperature	Alloys imparting hardenability (nickel, molybdenum, etc.) must be added to obtain adequate hardenability in heavy sections. Distortion during heat treatment is minimized	Pump liners and other applications requiring good wear resistance and minimum of distortion
	Matrix should be predominantly pearlitic or martensitic prior to flame hardening	Gears, crankshafts, dies, machine guides, etc.
	Matrix should be predominantly pearlitic or martensitic prior to induction hardening	Gears, crankshafts, dies, machine guides, etc.

low 1 additional hour at each holding temperature for each inch of section thickness

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CABLE ADDRESS "AVONWAYS"

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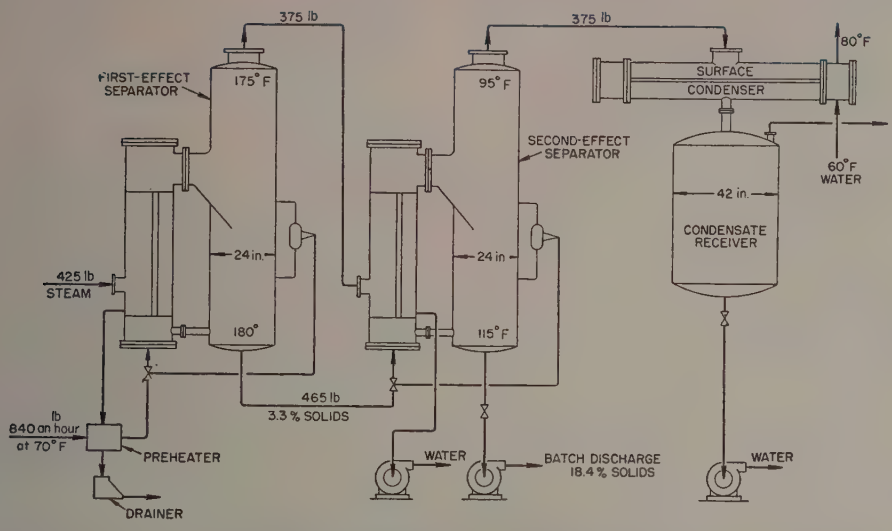


Flow diagram of the evaporator for recovering zinc plating solution from rinse water

Cyanide Recovery Pays Double Dividend

CED WITH a cyanide disposal blem, a maker of television an- nas found he could recover his c plating solution from rinse ter cheaper than he could de- by it.

o chlorinate the cyanide-pol- ed water would cost 60 cents pound of sodium cyanide de- oyed. To recover it costs 18 ts per pound.

Equipment—The antenna manu- turer, Channel Master Corp., enville, N. Y., processes its se water through a double-ef- evaporator made by the lovak Equipment Division of w-Knox Co. Rated capacity of equipment is 750 lb of water hour when supplied with 100 lons of rinse water containing 5 per cent solids.

n the recovery of plating solu- , enough water is evaporated increase the concentration of nides up to 12 to 15 ounces per lon in the evaporator. Operat- temperatures of the equipment low enough to prevent conver- n of the cyanides to carbonates. of double-effect evaporation uces steam requirements to that required by single-effect poration.

First Step—Waste plating solution is collected in a 300-gallon tank from the overflow of the first of four rinse tanks. Rinse water normally cascades from tank to tank countercurrent to the movement of plated products. Flow rate ranges from ½ to 1½-gpm. Concentration of sodium cyanide, zinc cyanide and sodium hydroxide in the first rinse tank may be as high as 1.25 to 1.50 ounces per gallon of water, but usually is less than half this much.

If the rinse water contains any chromate from accidental contamination, it is neutralized by the addition of sodium hydrosulphide in the holding tank.

First Effect—The contaminated rinse water is pumped from the holding tank through a preheater or heat exchanger into the first-effect evaporator tubes. It flows upward through the tubes at high velocity, absorbing heat from the surrounding steam chest.

Low pressure steam raises the temperature of the preheated solution to a boiling point of about 180°F—determined by a vacuum maintained in the first-effect separator. The condensing steam then passes through the preheater to give some of its remaining heat to the incoming rinse solution, and is discharged through a conventional steam trap to waste.

Second Effect—The portion of the waste rinse water that is evaporated and separated in the first effect is used as the heating medium in the steam chest of the second-effect evaporator. Here a higher vacuum reduces the boiling point to 115°F.

To keep entrainment to a minimum of 5 ppm, the vapor head of each evaporator is equipped with a York mesh demister. The portion of the rinse water that collects as condensate in the first-effect separator is passed to the second-effect separator.

Recovery — Three products are removed after second-effect evaporation. Two of them are distilled water—condensate from the second-effect steam chest and the condensed water from the separator. The latter passes into a surface condenser where its temperature is reduced by cooling water and then into a condensate receiver under vacuum. The distilled water from steam chest and condensate receiver are pumped independently into a 300-gallon holding tank to be re-used as plating rinse water.

The third product, condensate

REPUBLIC BOXES ar

simplify parts handlin

Republic Boxes and Skids are used on the production line at Toledo Scale. Parts are moved from one machining operation to another quickly and easily by lift truck or hand-operated units.

Finished parts are stored in neat areas like this. Boxes are labeled with part numbers. Box and skid design permits easy visual inspection for inventory checks. Fits in nicely with other-type units.

...provide Toledo Scale wi

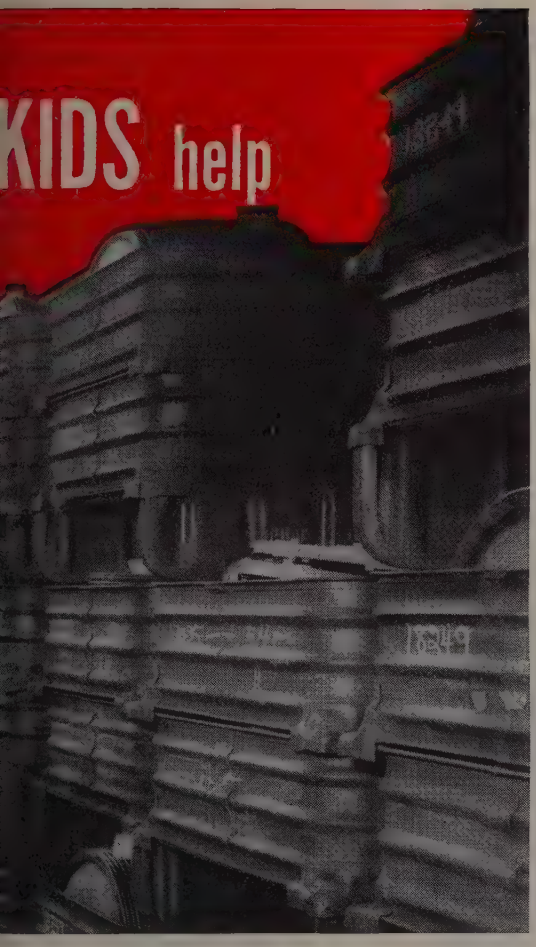
keep everythi

Neat, wide, uncluttered aisles are typical of Toledo Scale Company plant at Toledo, Ohio. Repu Steel Box and Skid Units are used at practically e stage of production, from receiving to shipping.

For example, keeping track of and handling thousands of parts needed for the products manu tured by Toledo Scale could be a difficult job. But company does it efficiently and at low cost with help of Republic PB-130 Box and Skid Units.

These units are specifically designed for stack Box capacity can be varied by adding or remo ring sections. Stacking brackets are welded to bottom corners of each box. Tiering lugs are we to some boxes so that, when they are used as the section, additional complete units can be tiered.

The skids are equipped with bumper-type cha runners. These are arc welded to the skid legs ad



place for everything—
its place

gth to the sides and protecting skid ends and surfaces.

e PB-130 is only one of many types of box and units manufactured by Republic's Pressed Steel sion. There is a wide range of sizes from which to se. Or if you have a special handling problem, blic engineers are available to help you design a to meet your individual requirements. The coupon bring you more facts by return mail.

REPUBLIC STEEL

World's Widest Range
Standard Steels and Steel Products

SIMPLIFY WEIGHT PROBLEMS WITHOUT LOSS OF VITAL STRENGTH. The high strength-to-weight ratio of Republic Alloy Steels permits smaller sections to carry heavier loads safely, like the gears and shafts of this huge power shovel. Vital parts are tough—resist shock, impact, vibration. Republic metallurgists will help you select the proper analysis for your product.

SIMPLIFY YOUR FLAT ROLLED STEEL PROBLEMS. Republic produces a wide line of flat rolled products including hot and cold rolled sheets and strip, galvanized, galvannealed, electro-zinc-plated, silicon steels and many others. The world's widest strip mill—98 inches—operated by Republic, produces steel wide enough for one-piece auto tops.

SIMPLIFY YOUR FASTENER BUYING. Republic's Bolt and Nut Division makes more than 20,000 regular types and sizes of headed and threaded products—over 8,000 specials. Everything from machine bolts to "Nylok" Nuts and high-strength bolts. You can depend on Republic Fasteners for quality, ease of application, uniformity, long service life. Quick delivery, too.

REPUBLIC STEEL CORPORATION
3120 East 45th Street
Cleveland 27, Ohio

☐ Please have a Materials Handling Engineer call.

Please send more information on:

☐ Materials Handling Equipment ☐ Alloy Steels
☐ Sheets ☐ Fasteners

Name_____ Title_____

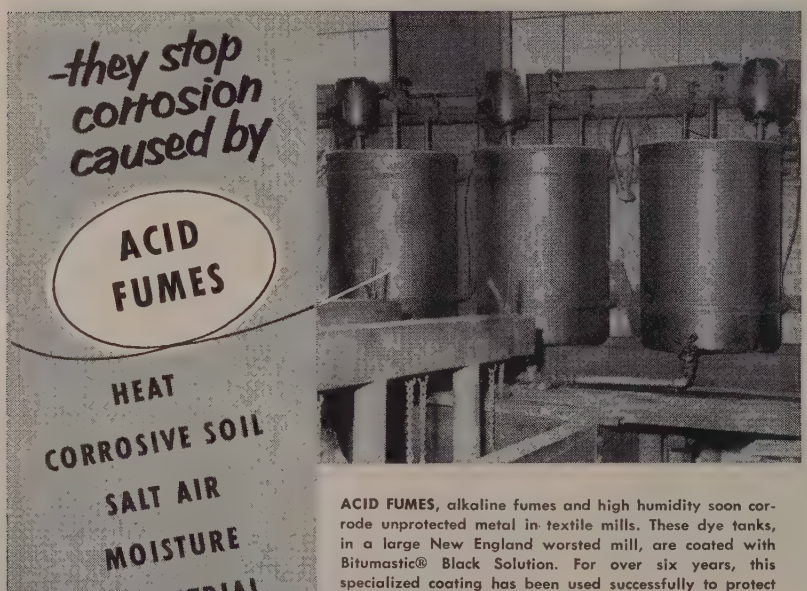
Company_____

Address_____

City_____ Zone____ State_____

K-8322A

You can solve your **tough** corrosion problems by using Bitumastic® Coatings



ACID FUMES, alkaline fumes and high humidity soon corrode unprotected metal in textile mills. These dye tanks, in a large New England worsted mill, are coated with Bitumastic® Black Solution. For over six years, this specialized coating has been used successfully to protect these tanks against corrosive chemical agents and moisture.

TOUGH CORROSION PROBLEMS can be solved, but not by using ordinary paints or conventional protective coatings. For long-term protection, it takes *specialized* protective coatings . . . the Bitumastic Coatings Koppers makes.

Bitumastic Protective Coatings are specially formulated from a tar-pitch base* that is, for all practical purposes, impervious to moisture. These coatings keep moisture away from exposed metal surfaces . . . and that's the *best* way to stop corrosion.

With tough, durable Bitumastic Protective Coatings, a thickness up to eight times that of ordinary paints can be obtained in one application. Where other factors are equal, the *thicker* the coating the *longer* the period of protection.

Send for a set of free booklets describing the family of Bitumastic Protective Coatings. At the same time, tell us about *your* corrosion problems so that we can suggest a satisfactory solution. There is no obligation, of course.

** Hi-Heat Gray is a non-coal-tar vehicle and metallic pigment.*

KOPPERS COMPANY, INC.
Tar Products Division, 1178-T, Pittsburgh 19, Pennsylvania
DISTRICT OFFICES: BOSTON, CHICAGO, LOS ANGELES, NEW YORK, PITTSBURGH, AND WOODWARD, ALA.
KOPPERS PRODUCTS LIMITED District Offices: Toronto & Edmonton

in the bottom of the second-
separator, is plating solutio
about the same composition a
original. It is pumped into
other 300-gallon holding tan

Automatic Operation — Dis
water in the receiver is pu
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is required than is obtaine
evaporation of the contami
rinse water, it is obtained
the steam that condenses in
preheater and in the heating
of the first effect.

Operation of the evaporato
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Steam input to the evaporat
regulated by a float contro
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holding tank. Solution lev
the separators regulates the
of waste rinse water into the
orators.

Economically Practical —
efficiency of heat transfer is
of the principal features of
Buflovak evaporator that m
the reconcentration of platin
lution economically practical.

Further efficiency of oper
results from the tangential
od of introducing vapor and
into the vapor separator. Th
sulting centrifugal separatin
tion allows the vapor to rise
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stream of water.

Cost—Operating experienc
dicates a steam consumption
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sodium cyanide recovered.
ejector unit used with the
orator requires an additional
at 90 to 100 psi. About 500
lons of cooling water at 60°F
required for each pound of so
cyanide recovered.

With steam at $1 per 10
and cooling water at 7 cent
1000 gallons, these costs ad
to 18 cents per pound of so
cyanide recovered. These fi
cover the recovery of zinc cy
and sodium hydroxide. Total
is less than 1 man-hour per 8
shift.

The system is recovering
drag-out from about 11,000
lons of zinc plating solution i
plating tanks. It has a maxi
capacity of 160 lb of sodiu
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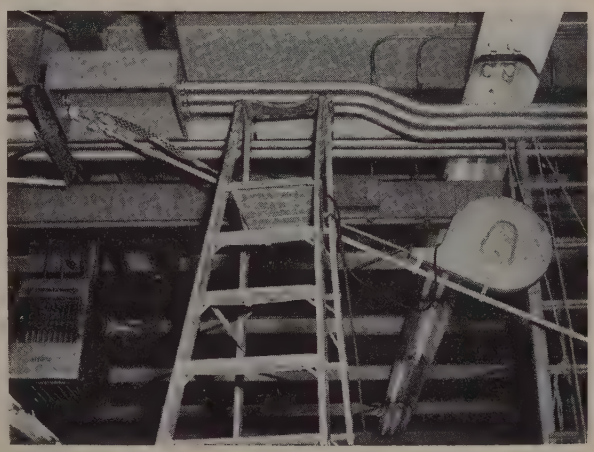
Cable Puller Saves Time, Energy and Money



No longer do you have to push a fish tape through long runs of conduit and pull the wire back by hand.

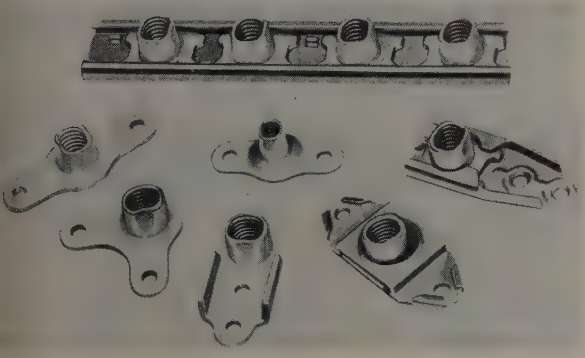
The cable puller will push 175 ft of steel fish tape through conduit with up to five 90-degree bends. Its pulling capacity is 1200 lb, regardless of wire or conduit size.

The tape has a tensile strength of about 250,000 psi. Because it is always in the tool or in the conduit, it is practically impossible to buckle or break it.

The tool has a lightweight, high-torque motor. It can deliver 2 hp up to 15 minutes, sufficient time to pull any cable the unit can handle.

Special fittings couple the cable puller to the conduit. A flexible sleeve grips the cable firmly. *Write*: Barth Corp., 12650 Brookpark Rd., Cleveland, O. *Phone*: Winton 1-1440

Stainless Steel Nuts Reduce Weight



These anchor and gang channel locknuts can be used in temperatures up to 800° F.

Weight savings of the new designs range from 16 to 63 per cent. The nuts meet the needs of electronic equipment and armament systems for aircraft and guided missiles.

Shapes include one and two lug anchor or plate nut shapes. Thread sizes in the anchor line are 6-32, 8-32, 10-32 and ¼-28. All except the 6-32 are available in gang channel nuts. The nuts are used in blind mountings. *Write*: Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J. *Phone*: Murdock 6-6000

Grinding Compound Is Water Soluble and Transparent

Exceptional rust control is offered by this concentrated chemical solution at dilutions between 1:100 and 1:200. When diluted with water, it forms a colorless, odorless fluid that will not irritate the skin nor turn rancid.

The compound, Cimplus, reacts with steel or cast iron to form a film which cannot be penetrated by air or water.

The low depletion rate of the rust inhibitors gives long-lasting protection in machining cast iron.

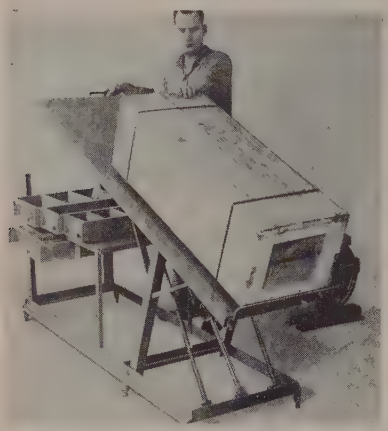
Grinding wheels are not loaded by Cimplus. It isn't oily and has good wetting characteristics.

The settling ratio is high enough to prevent grits from recirculating, low enough to avoid clogging of return lines in central systems. The compound is nonflammable. *Write*: Cincinnati Milling Products Division, Cincinnati Milling Machine Co., Cincinnati 9, O. *Phone*: Redwood 1-2121

Packing Bench

Boxes weighing up to 1000 lb can be put on the floor with this packing bench. A hydraulic cylinder allows the operator to tip the load from table to floor with a control lever.

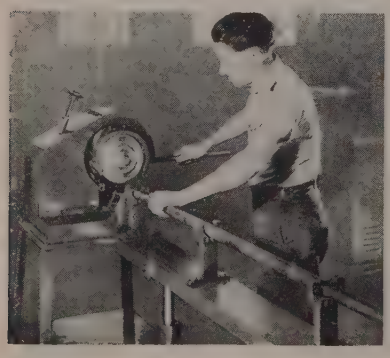
A 3-in. height adjustment can be made to suit the operator. Built-in drawers provide storage space for tools and packing materials. The table is 24 x 72 in.



The cylinder that operates the table needs no power other than the load being handled; a closed hydraulic system controls the tilt of the table through a by-pass operated by a single valve. *Write*: Valley Craft Products Inc., Division of O'Neil-Irwin Mfg. Co., 750 Jefferson Ave., Lake City, Minn.

Tube Cutoff Machine

Up to 2000 pieces an hour can be cut with this rotary unit. Size range: ⅜ to 1½-in. in diameter. A 7-in. cutoff wheel, rotating at about 300 rpm, descends to contact the tube as the handle is lowered and spins the tube on hardened rollers. The cutting action is through the wall thickness rather than the entire diameter. A ¼-hp gear head motor powers the guard-protected wheel. *Write*: Continental Machine Co., 1952 N. Maud Ave., Chicago 14, Ill. *Phone*: Diversey 8-6596



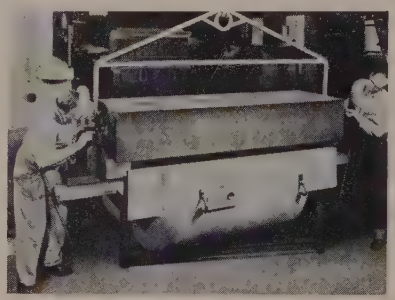
Air Filters

All traces of oil and oil vapors, solid particles over 3 microns in size, odors and moisture are removed by an easily replaceable air filter.

Large quantities of contaminants can be absorbed before the filter needs to be changed. In operation, oil, vapors, moisture and contaminants are diverted around the filter by a top baffle and into a sump at the bottom. *Write*: Wilkerson Corp., Englewood, Colo. *Phone*: Sunset 1-7801

Granite Surface Plates

Diabase (black granite) surface plates have one or more edges finished square with the top surface.



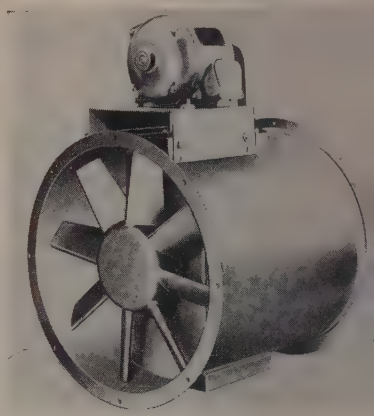
The surface and edges can be lapped either uniformly convex or concave. Diagonals of the plate are the same within 0.0001-in. *Write*: Rahn Granite Surface Plate Co., 641 N. Western Ave., Dayton 7, O. *Phone*: Melrose 1951

Airfoil Fans

New heavy-duty fans have streamlined contours on all surfaces that contact the air stream. A new hub design approximates the motor diameter. It eliminates turbulence over the motor and back flow.

The blade produces an even distribution of air velocity from hub to tip. The blade angles are large at the hub and small at the tip.

Wheels of two, four, six and eight blades meet different pressure and volume requirements.



Fans deliver from 1240 to 102,000 cfm in sizes ranging from 1 to 72 in. Static pressures rang from ⅛ to 3½-in. *Write*: Chicag Blower Corp., 9869 Pacific Ave Franklin Park, Ill. *Phone*: Glad stone 5-4780

Fume Removal

The push-pull system saves hea in removing fumes over plating anodizing and pickling tanks. collector or exhaust hood remove fumes. A director supplies a cur rent of air to direct the fume into it.

The director, a compact air sup ply unit containing its own moto and blower, will furnish an eve air current across a tank surface tanks 6 ft wide can be ventilated

Heat is saved because fume re moval rates are reduced as muc as 75 per cent. Power is saved a smaller fans are needed. Initia costs are less because smalle ducts and stacks can handle th smaller volume of fumes.

Units are easy to install an come in standard sizes. *Write* Heil Process Equipment Corp 12901 Elmwood Ave., Clevelan 11, O. *Phone*: Academy 1-65

Magnetic V-Block

The adjustable V-block is mad of alternate laminations of no magnetic brass strip and materi with high permeability and lo residual magnetism. It's used f setting up grinding jobs.

The V-block is set quickly.

Announcing a new UNITED® Heavy-Duty ROLLER STRAIGHTENING MACHINE

FOR:

- RAILS
- BEAMS
- ANGLES
- CHANNELS
- TEES ETC.

United is pleased to offer to the industry a new member of its family of products, the illustrated United-Lamberton Heavy Duty Roller Straightening Machine. This machine was developed and placed in operation by Lamberton & Company, Ltd. of Scotland. The rights to its manufacture were acquired from this company by United, after being thoroughly convinced of its proven value for its intended purpose. As many as 400 tons of rails have been handled on one of these machines in one eight hour shift.

Among the many outstanding advantages of this machine are:

- **Simplicity and Ease of Axial Adjustment and Roll Opening Variations.**
- **The Speed With Which Roll Changes Can Be Made.**
- **Greatly Stepped-Up Finishing of Rail and Structural Products.**

Your inquiry is solicited. Complete details are available without obligation.

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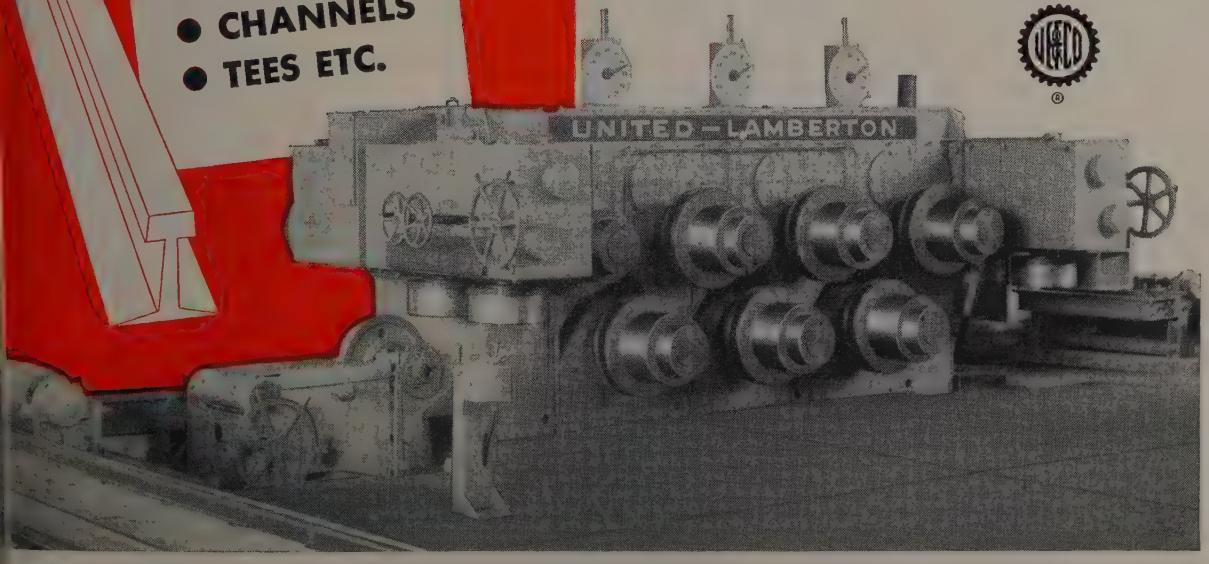
ENGINEERING AND FOUNDRY COMPANY

Pittsburgh, Pennsylvania

Plants at Pittsburgh • Vandergrift • Youngstown • Canton
Wilmington (Lobdell United Division)

Subsidiaries: Adamson United Company, Akron, Ohio
Stedman Foundry and Machine Company, Inc., Aurora, Indiana

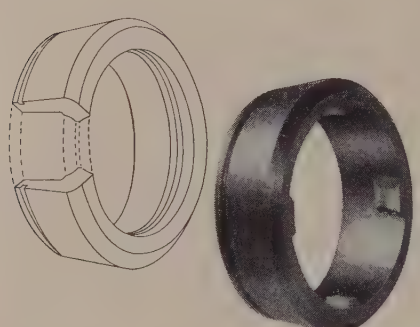
Designers and Builders of Ferrous and Non-Ferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



can be installed and removed without chuck adjustment.

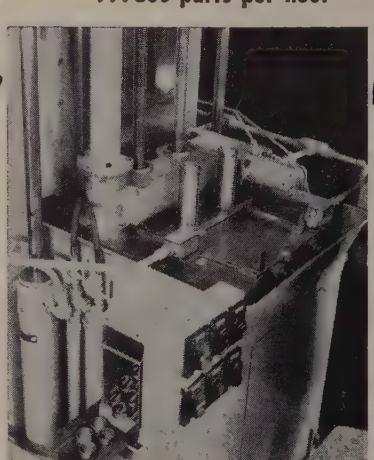
The V-groove is precision ground to 90 degrees. It's parallel to the base and side of the bottom block to ±0.00005-in. over the entire length. The vernier is graduated to 5 minutes; settings are accurate to 15 seconds.

Drill presses and other machines with magnetic chucks can use it. *Write*: Anton Machine Works, 1227 Flushing Ave., Brooklyn 37, N. Y. *Phone*: Hegeman 3-2609



I. D. and four inverted helical splines BROACHED the *American* way

...300 parts per hour



American engineering made this broaching operation fast, automatic and economical.

The finished inside diameter and four inverted helical splines are broached, in this automotive synchronizer ring, two at a time . . . 300 per hour.

American special combination round and spiral spline broaches are used to cut the splines concentric with the I.D.

Feed tubes are here shown as manually loaded but are readily adapted to automation. Parts are fed and ejected by automatic hydraulic slides.

You may have parts that can be produced at significantly lower cost by broaching them the American way. Send part print or sample . . . American engineers will make a recommendation you'll find valuable.

American Catalog 450 is a complete broaching manual . . . write for it today.

AMERICAN *American* BROACH & MACHINE CO.
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN
See *American* First — for the Best in Broaching Tools, Broaching Machines, Special Machinery

SUNDSTRAND

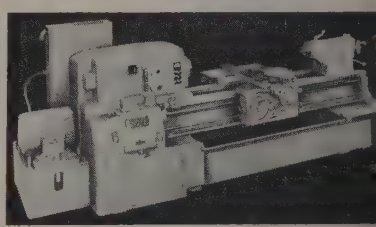
Lathes

Eight lathes have been added to the Series 62 lines. On each model spindle speeds are selected dial on the headstock which shows the speed for the next cut to be preselected while the lathe is cutting.

When the spindle is stopped to adjust the cutting tool for the next cut, the headstock gears shift automatically to the preselected speed.

There are 36 spindle speeds in geometric progression—from 1 to 1750 rpm.

A surface speed dial allows spindle speeds to be selected directly from diameter sizes.

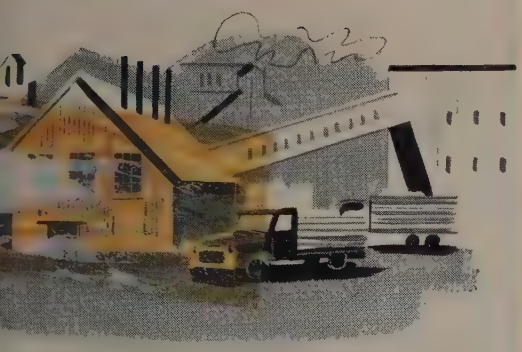


Clearance diameters range from 16 to 28 in. The swing over the cross slide is from 10 to 19 in. The smaller lathes have 10-hp motors, the larger ones, 20 hp. *Write*: Monarch Machine Tool Co., Sidney, O. *Phone*: 2-1381

Tap Holders

Heavy-duty tap holders allow sideways adjustment of the tap to compensate for inaccuracies of turret lathe indexing.

One set of adjustable jaws covers tap squares from ⅞ to 2 in. another from 2 to 3⅛-in. The tap holders also can be mounted in boring mills and radial drill presses. *Write*: E. F. Vilter Co., 410 N. Richards St., Milwaukee 1, Wis. *Phone*: Edgewood 2-7810



VEIRTON

LVANIZED SHEETS

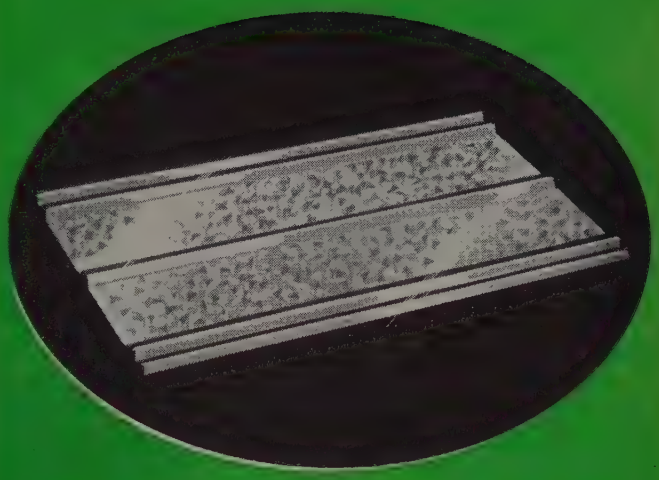
for long-lived
ofing and siding

e's an easy way to solve roofing and siding
ems quickly, dependably, economically.
's the Weirton way—with Weirton gal-
ed steel sheets. Their tight zinc coating
ts cracking, peeling and flaking. The
gth of steel plus the corrosion resistance
nc gives added years of life. And long
ience shows that galvanized sheets give
protection, with less maintenance and
wer cost.

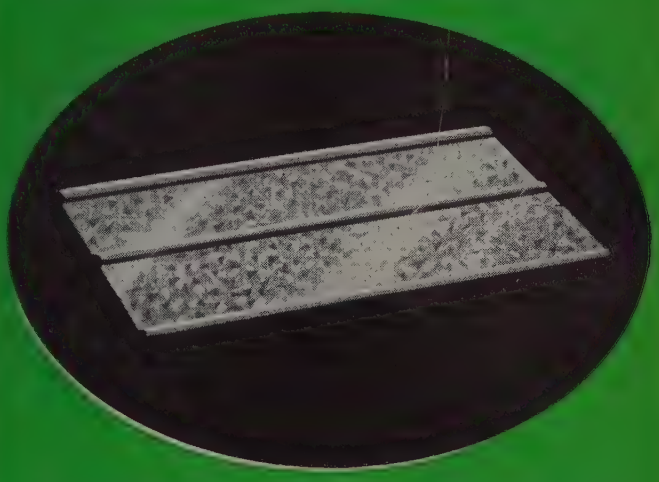
ton's modern production processes, plus
quality control all along the line, make
ton galvanized sheets a best buy for your
g and siding needs.

EIRTON STEEL COMPANY
Weirton, West Virginia

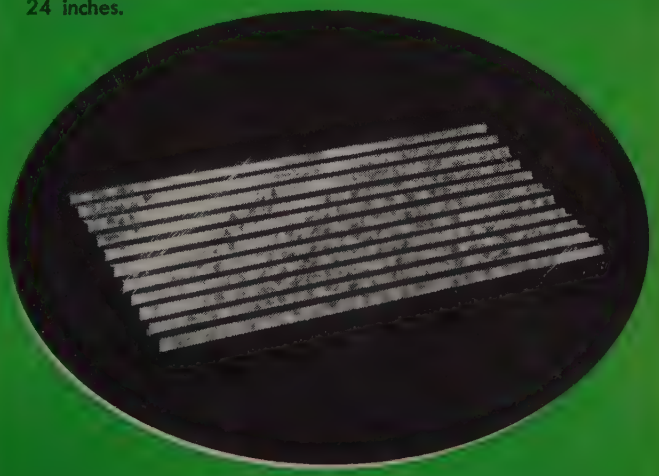
TIONAL STEEL CORPORATION



Famous Weirton "Safety Drain" galvanized steel sheets combine maximum protection with outstanding good looks.



Weirton galvanized V-Crimp sheets are made in 2V-, 3V-, and 5V-crimped, and in gauges 26, 28 and 29; covering width, 24 inches.



Weirton galvanized corrugated steel sheets are most economical in first cost, and are the strongest form of steel roofing because the corrugations strengthen the entire sheet.

NEW Literature

Write directly to the company for a copy

Instrumentation

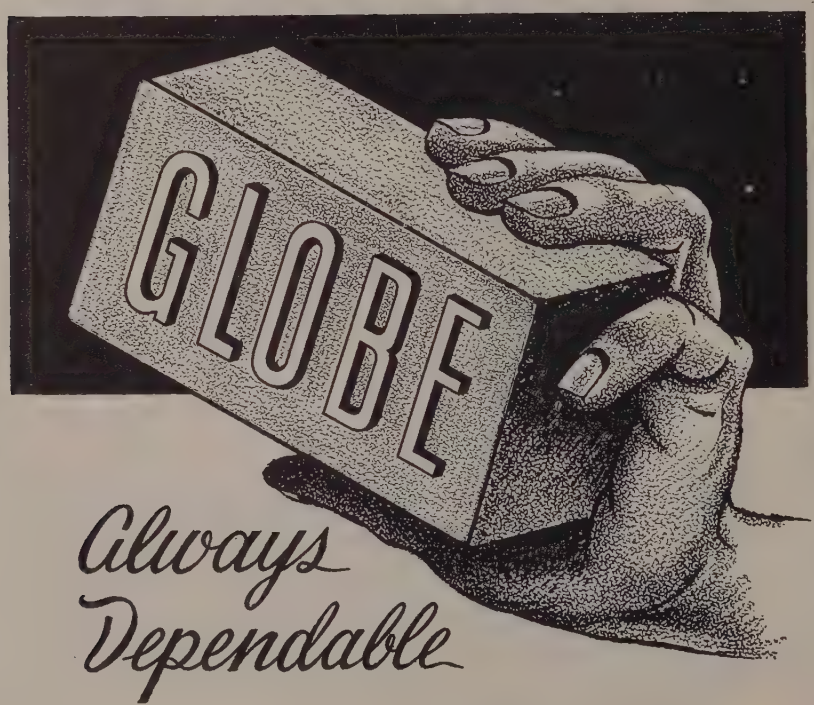
Automatic control and instrumentation, water conditioning and steam testing equipment, chemical feeding devices and chemicals for metal protection are discussed—bulletin GSP-901, 28 pages. Hagan Corp., 323 Fourth Ave., Pittsburgh 30, Pa.

Notching Presses

Press and fixture specifications for notching machines, segment notchers, a slotting machine and a band punching machine are detailed—catalog 55, 16 pages. V & O Press Co., division of Emhart Mfg. Co., Hudson, N. Y.

Contour Projectors

Detailed descriptions of six projectors are given, and the use of optical gaging is discussed—12 pages. Special Products Sales Division, Eastman Kodak Co., 343 State St., Rochester, N. Y.



SUPERIOR LADLE BRICK

The greater heat resistance of GLOBE brick is well known in the steel industry. Because these bricks, wire cut or dry pressed, last longer—saving much time lost in refractory replacement—they help increase melting capacity. There is a type for every need, so let us place our experience at your disposal.

Lowers Per Ton Cost and Increases Melting Capacity

SERVING THE STEEL INDUSTRY SINCE 1873

The GLOBE BRICK Co.
EAST LIVERPOOL, OHIO

Plant Ventilators

Technical data are given for er roof, continuous ridge and gravity ventilators—4 pages. A can Steel Band Co., P. O. Box Pittsburgh 30, Pa.

Thread Grinders

Automatic units for grindin ternal threads are described— tin 481051, 8 pages. Ex-Cell-O 1200 Oakman Blvd., Detroit 32,

Grinding Wheels

This booklet tells how to wheels to precision grind too construction steels—22 pages. ton Co., Worcester 6, Mass.

Plastic Pipe

Rigid polyvinyl chloride pip properties and installation fe are covered—bulletin 24, 28 National Tube Division, U. S. Corp., 525 William Penn Place, burgh 30, Pa.

Triple-Action Press

Design features of presses fast advance, slow draw and return are given—4 pages. Ha Press Division, Baldwin-Lima ilton Corp., Hamilton, O.

Tracer Lathes

Specifications and typical j high production lathes are cov bulletin HDT-55, 4 pages. Feed Machine Tool Corp., 7 Eight Mile Rd., Ferndale, Mich.

Gear Checking

Machines and equipment for ing external, internal and gears are described—catalog 16 pages. National Broach & chine Corp., 5600 St. Jean Ave troit 13, Mich.

Machine Tool Drives

Special and standard motor adjustable speed drives for th chine tool industry are descr bulletin 1750. Louis Allis Co. waukee 7, Wis.

Alloy Steels

Two low-alloy, high-strength are described—from raw mater engineering properties — 32 Sheffield Steel Division, Armco Corp., Houston, Tex.

Materials Handling

Here are technical data on tory equipment, feeders, conv power tools, shaft seals and e hammers—catalog 5510, 50 Syntron Co., 370 Lexington Homer City, Pa.

Market Outlook

RESSURE for steel price increases showed self with a $6-to-$20-a-ton rise in price extras a two structural items made by Jones & aughlin Steel Corp., Pittsburgh. The increases, fective Nov. 21, were on junior beams and nior channels, made exclusively by J & L.

I LINE— The median of those increases is 13. STEEL (Nov. 14, p. 59) said steel prices ight go up $12 a ton by next July, with the robabilities that the rises would come piece-eal and on selected products—the least profit-ble ones.

Structurals are not the most profitable of nished steel products. Because of the heavy olume of construction, structural demand has een outrunning supply.

ARS UP—Base prices on rail steel merchant rs were raised $2 a ton by Calumet Steel Divi-on (Chicago Heights, Ill.) and the Franklin teel Division (Franklin, Pa.) of Borg-Warner orp., and by Inland Steel Co. (Chicago Heights, l., plant). Rail steel merchant bars are now 65 cents a pound, the same as new billet steel erchant bars.

MPORTS RISE—If you use foreign steel, ou'll have to pay more. Import prices on most ajor steel products from Western Europe are p $2 to $11 a ton. The $11 increase is on hot-olled carbon sheet, a product hard to get do-estically. Not only is demand heavy but the arrow profit margin on it influences producers o divert their steel into more profitable items, uch as cold-rolled sheets. Also reflecting the eavy demand and low profit in the domestic arket is the price of imported steel plate. It is $50 a ton over plate produced in the U. S.

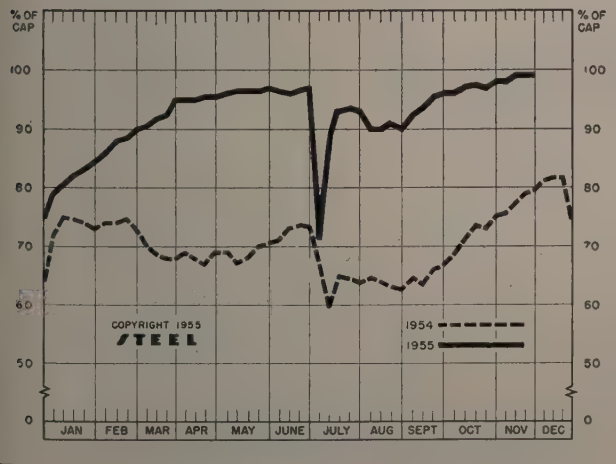
Higher prices are cropping out in the scrap market, too. STEEL's price composite on steel-making scrap rose in the week ended Nov. 23 to $46.33 a gross ton—highest level since January, 1951, the Korean War period. The latest increase was 66 cents a ton and marked the fourth consecutive week of rise.

NEAR THE TOP— Steel producers in the week ended Nov. 27 were able to maintain their ingot operations at 99 per cent of capacity for the third consecutive week. They've now turned out more steel than in any year except record-breaking 1953. Output now totals 105,530,000 net tons of steel for ingots and castings, exceeding 1951's 105,199,848 tons. If production can be sustained at current levels, the 1953 record of 111,609,719 tons will be eclipsed at mid-December.

AFTERTHOUGHT— The heavy demand for steel is influencing consumers to make the most of government ratings. Some are endeavoring to apply ratings to tonnage to compensate for steel laid in earlier this year. These are cases where ratings were applicable but not used because of the freer supply of steel then. Result: Producers are carefully scrutinizing all requests for rated tonnage.

PRESSING— Railroads are pressing for car steel, and are receiving some political backing. A U. S. representative from West Virginia, in a letter to the American Iron & Steel Institute, urges steel producers to step up shipments so that 8000 to 10,000 freight cars can be built a month, double the present rate.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Nov. 27	Change	Same Week 1954	Same Week 1953
Pittsburgh	103	+ 1*	77.5	77
Chicago	98	— 1*	90	96.5
Mid-Atlantic	98	0	72	90
Youngstown	100	0	83	93
Wheeling	101	+ 1	79.5	78
Cleveland	100	0*	86	98
Buffalo	105	0	97.5	99.5
Birmingham	94	— 0.5	64	96.5
New England	90	0	58	85
Cincinnati	92.5	0	75.5	67.5
St. Louis	109.5	+10	82	98
Detroit	95	— 3	80	97.5
Western	99	0	83	93
National Rate	99	0	79.5	87.5

INGOT PRODUCTION‡

	Week Ended Nov. 27	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	148.7†	149.0	150.2	119.2
NET TONS (In thousands)	2,389†	2,394	2,413	1,915

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,413,278 in 1955; 2,384,549 in 1954; 2,254,459 in 1953.

working Outlook—p. 59 Technical Outlook—p. 97

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Nov. 22 1955	Nov. 15 1955	Month Ago	Oct. Average
(1947-1949=100)	154.5	154.5	154.5	154.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Nov. 22

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parenthesis. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.200
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	7.993
Tie Plates	5.625	Strip, C.R., Stainless, 430 (lb)	0.444
Axles, Railway	8.000	Strip, H.R., Carbon	5.350
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.366
Plates, Carbon	4.950	Pipe, Galv., Buttweld (100 ft)	19.971
Structural Shapes	4.867	Pipe, Line (100 ft)	158.925
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H.R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R. Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	20.980
Bars, H.R., Alloy	9.375	Tubing, Mechanical, Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 303 (lb)	0.450	Tin Plate, Hot-dipped, 1.25 lb	8.933
Bars, H.R., Carbon	5.350	Tin Plate, Electrolytic, 0.25 lb	7.633
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.733
Bars, C.F., Carbon	8.660	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.175	Wire, Drawn, Stainless 430 (lb)	0.578
Bars, C.F., Stainless, 302 (lb)	0.468	Bale ties (bundle)	6.473
Sheets, H.R. Carbon	5.145	Nails, Wire, 8d Common	8.618
Sheets, C.R., Carbon	6.239	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.690	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless, 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Nov. 23 1955	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	208.90	208.90	208.90	194.53	157.76
Index in cents per lb	5.659	5.659	5.659	5.270	4.274

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.14	$128.14	$128.14	$117.95	$95.09
No. 2 Fdry, Pig Iron, GT	58.99	58.99	58.99	56.54	49.54
Basic Pig Iron, GT	58.49	58.49	58.49	56.04	49.04
Malleable Pig Iron, GT	59.77	59.77	59.77	57.27	50.27
Steelmaking Scrap, GT	46.33	45.67	45.00	33.08	41.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as wise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Nov. 23 1955	Week Ago	Month Ago	Year Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30
Bars, H.R., Chicago	4.65	4.65	4.65	4.30
Bars, H.R., deld. Philadelphia	4.90	4.90	4.90	4.55
Bars, C.F., Pittsburgh	5.90	5.90	5.90	5.40
Shapes Std., Pittsburgh	4.60	4.60	4.60	4.25
Shapes, Std., Chicago	4.60	4.60	4.60	4.25
Shapes, deld., Philadelphia	4.88	4.88	4.88	4.53
Plates, Pittsburgh	4.50	4.50	4.50	4.225
Plates, Chicago	4.50	4.50	4.50	4.225
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.225
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225
Plates, Claymont, Del.	4.80	4.80	4.80	4.225
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95
Sheets, C.R., Detriot	5.325-5.425	5.325-5.425	5.325-5.425	5.10
Sheets, Galv., Pittsburgh	5.35	5.85	5.85	5.45
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05
Strip, H.R., Chicago	4.325	4.325	4.325	4.05
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75
Strip, C.R., Chicago	6.35	6.35	6.35	6.00
Strip, C.R., Detroit	6.35	6.35	6.35	5.60-5.90
Wire, Basic, Pittsburgh	6.25	6.25	6.25	5.75
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.45	$9.05
SEMIFINISHED STEEL				
Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00
Wire rods, ½-⅝" Pitts.	5.025	5.025	5.025	4.675
PIG IRON, Gross Ton				
Bessemer, Pitts.	$59.50	$59.50	$59.50	$57.00
Basic, Valley	58.50	58.50	58.50	56.00
Basic, deld. Phila.	62.16	62.16	62.16	59.66
No. 2 Fdry, Pitts.	59.00	59.00	59.00	56.50
No. 2 Fdry, Chicago	59.00	59.00	59.00	56.50
No. 2 Fdry, Valley	59.00	59.00	59.00	56.50
No. 2 Fdry, deld. Phila.	62.66	62.66	62.66	50.16
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58
Malleable, Valley	59.00	59.00	59.00	56.50
Malleable, Chicago	59.00	59.00	59.00	56.50
Ferromanganese, Duquesne.	190.00†	190.00†	190.00†	190.00†

†74-76% Mn, net ton. °75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$45.50	$45.50	$44.50	$33.50
No. 1 Heavy Melt, E. Pa.	48.00	47.00	46.50	32.25
No. 1 Heavy Melt, Chicago	45.50	44.50	44.00	33.50
No. 1 Heavy Melt, Valley	48.00	48.00	48.00	34.50
No. 1 Heavy Melt, Cleve.	45.50	45.50	45.50	32.50
No. 1 Heavy Melt, Buffalo	43.50	43.50	38.50	31.50
Rails, Rerolling, Chicago	66.50	66.50	65.50	54.50
No. 1 Cast, Chicago	48.50	47.50	47.50	39.50

COKE, Net Ton

Beehive, Furn, Connlsvl.	$13.625	$13.625	$13.625	$13.75
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75
Oven, Fdry, Chicago	25.75	25.75	25.75	24.50

Daily Nonferrous Price Record

	Price Nov. 23	Last Change	Previous Price	Oct. Avg.	Sept. Avg.	Nov. 1954 Avg.
Copper	43.00-46.50	Oct. 17, 1955	43.00-46.00	44.594	45.380	30.000
Lead	15.30	Sept. 26, 1955	14.80	15.300	14.920	14.800
Zinc	13.00	Oct. 21, 1955	13.00-13.50	13.020	12.940	11.500
Tin	98.875	Nov. 22, 1955	98.75	96.230	96.565	91.196
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	60.000
Aluminum	24.40	Aug. 8, 1955	23.20-24.40	24.400	24.400	22.200
Magnesium	32.50	Aug. 16, 1955	28.50	32.500	32.500	27.000

Quotations in cents per pound ba
COPPER, deld. Conn. Valley; LEA
mon grade, deld. St. Louis
prime western, E. St. Loui
Straits, deld, New York; NICKE
trolytic cathodes, 99.9%, base
refinery, unpacked; ALUMINUM,
ingots, 99 + %, deld.; MAG
99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.**
  Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.**
  Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.**
  Maybe you want to keep a continuous record of p
  spread between various forms of steel. You can get y
  base price information from STEEL's price tables.
- **A source of information on market trends.**
  Newsy items tell you about the supply-demand situa
  of materials, including iron and steel, nonferrous me
  and scrap. Other articles analyze special situations of
  terest and importance to you.
- **Reports on iron and steel production, and materials and p**
  uct shipments.

why STAINLESS STEEL TUBING?

ection of the proper grade of nless steel tubing is essential ause no single metal or alloy nomically resists all corrosive ditions. As certain physical prop- es are required for specific appli- ons, sometimes the considera- n of corrosion resistance is lected when the choice of tubing erial is made. For example, if a ree of corrosion resistance can mparted to ordinary steel by the of a protective coating, and if lacement cost of the article is , this may be the sensible course.

But where replacement cost is high, or where contamination through corrosion may occur, the wisest, and in the long run the most economical choice of tubing, is a stainless steel of the correct analysis for the conditions of manufacture and service.

Get in touch with Mr. Tubes, your link to B&W, for a detailed comparison of grades suitable for your use and learn how to get more for your money with stainless. *Or write for Bulletin TDC-160S.*

B&W
TUBULAR PRODUCTS DIVISION

THE BABCOCK & WILCOX COMPANY
TUBULAR PRODUCTS DIVISION
Beaver Falls, Pa. and Milwaukee, Wis.: Seamless Tubing, Welded Stainless Steel Tubing
Alliance, Ohio: Welded Carbon Steel Tubing
Milwaukee, Wis.: Seamless Welding Fittings

TA-5037(P)

Nonferrous Metals

If copper mines could produce at current levels for the next 12 months, the shortage could be over. Labor and market price hold the trump cards to high-level production

Nonferrous Metal Prices, Pages 140 & 141

STATISTICS released by the Copper Institute, New York, show that domestic and foreign crude production of the red metal hit all-time highs in October.

Results — Domestic production of crude was 100,208 tons, with secondary production registering 9863 tons. Foreign crude production totaled 145,462 tons, with secondary production reaching 1160 tons.

Meanwhile, domestic deliveries to fabricators dipped from 144,571 tons in September to 133,946 tons in October. In the foreign market, deliveries fell from 117,547 tons to 112,952 tons.

While there are indications that demand could outstrip supply for some time to come, there are other facts which keep pointing to a somewhat more normal copper supply.

Food for Thought — By projecting second quarter production of U. S. crude (313,761 tons) as the annual rate and adding 300,000 tons of imports, a total of some 1,555,044 tons of copper might have been produced this year. Industry estimates indicate that some 1,560,000 tons will be consumed. This would leave a deficit of at least 4956 tons.

Then came the change: The copper price, which averaged 36 cents a pound during the second quarter, began to climb to its present primary level of 43 cents a pound. Taking the October domestic production rate and projecting it as an annual rate figure (with the addition of 300,000 tons for imports), total available copper climbs to 1,620,852 tons—at 43 cents a pound. If the consumption rate would remain about the same for the next 12 months, 1,560,000 tons could be subtracted from the new total, leaving 60,852 tons left over at the end 1956.

Dreaming?—To have this much copper, there would have to be complete labor harmony, stockpile requirements would have to be low or even deferred and prices would have to remain at current levels, so that fringe producers would keep mines in operation.

The government has given a positive indication that it feels the copper situation may be coming into line. The Copper Division, Business & Defense Services Administration, has amended order M-11A. This change increases the mill space to be reserved for production of copper-base materials. The total reserve set by BDSA will be 116 million lb during the first quarter of 1956. This is an 8-million-lb increase over the third and fourth quarters of 1955.

Mill space reserved for alloyed brass mill plate, sheet, strip and rolls shows increases of 2 per cent for each. Rod, bar, shapes and wire are being increased from 5 to 8 per cent.

The 116 million lb reserved for next quarter will meet orders of th Defense department, AEC and d fense-related B products.

Crux—The government must fe that copper supplies are returning t normal, or it would not have take steps to increase copper setasides this time.

Crude Copper Production Hits New Peak

(in tons)

	Domestic		Foreign	
	Primary	Secondary	Primary	Secondary
Oct.	100,208	9,863	145,462	1,160
Sept.	96,343	12,739	140,606	1,049
Aug.	67,990	9,364	127,405	774
July	31,846	7,614	135,900	765
June	90,645	11,295	141,413	603
May	95,042	11,731	134,732	574

Source: Copper Institute

U.S. Studies Nickel

Nickel users are being investiga ed. In an effort to stem any desi by users to abuse the Defense Ma terials System setup on nickel, BDS is investigating all rated orde placed for November melting or pro essing.

BDSA explains that letters ha been sent to all melters and proce sors asking for detailed informatio concerning all defense-rated orde for nickel-bearing materials whic will be produced this month. An swers will be sent in by Dec. 1.

Each company must provide: Cu tomer's names; order numbers; d fense contract numbers, if available defense order ratings; product grades; per cent nickel conten shipped weight of products; and th amount of nickel ordered from su pliers to fill orders.

In a separate letter to users nickel and nickel products, BDS directs attention to the regulatio and orders pertaining to the use priority ratings. It points out tha these regulations will be "of particu lar interest to companies extendi ratings for nickel to be consumed electroplating and for replenishme of warehouse stocks."

Nickel users also have been i formed that this is the first of series of checks to be sure that the is compliance with DMS orders. will also help BDSA to measure th effectiveness of the materials syste

Aluminum: Records Fall

Aluminum production has outdo itself again. For the sixth time th year, the Aluminum Associatio New York, reports that a record h been set. Aluminum production October reached 269,312,211 lb. Pr vious all-time high was Augus when over 267 million lb were pr duced. October totals were mo than 8 million lb ahead of Septe ber, 1955, and jumped more than million lb ahead of the totals regi tered in September, 1954.

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport Brass Co.

Reporting new developments in copper-base alloys and metalworking methods.

Solid Brass Fireplace Equipment Gives Beauty More Than Skin Deep

Simple decorating trends, calling for warm, rich color accents, are enhanced by solid brass fireplace equipment in modern homes. For high quality fireplace fixtures such alloys as Bridgeport Yellow Sheet Brass have added advantages in ease of fabrication.

Wilshire Manufacturing Co., of Los Angeles, large producer of quality fireplace screens and accessories, asked Bridgeport Technical Service to recommend alloys that would meet Wilshire's rigid product requirements and still work satisfactorily in widely varied manufacturing operations. Specifications were reviewed from standpoints both of production and the basic objectives—quality products with good color characteristics and bright, enduring finish.

To achieve top quality an alloy of uniform fine grain structure was specified. Comprehensive tests established Bridgeport Yellow Brass Sheet as meeting every requirement. Variations in temper were recommended to facilitate the many different forming operations.

An important factor was that the sharpness of intricate filigree patterns used on firescreens and stands depends upon exact, uniform metal tempers. Excessive hardness dulls tools; softness causes ragged patterns and increases the number of rejected pieces.

Ductility proved essential in stamping firescreen feet, a process which stretches as well as compresses metal. Alloys must not crack, tear or fail on the sharp bends.

Wilshire has made wire weaving a fine art by developing a unique process which produces attractive, flexible screening. Here too, product quality was found to depend largely on the physical characteristics of the wire—proper tempering, dimensional accuracy and consistent conformity with manufacturer's specifications.

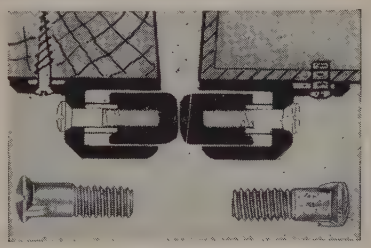
Product and production studies like these, made by Bridgeport's metal experts over the complete range of Wilshire's operations, resulted in specialized metallurgical recommendations covering all phases of manufacturing and materials requirements. In every case the Bridgeport alloys were exactly suited to Wilshire's varying production techniques for manufacturing wood baskets, shovels, screens, frames, legs, handles, and filigreed parts. In addition, Wilshire benefits from Bridgeport's pre-shipment materials inspection and quality control.

Any manufacturer looking for practical ways of maintaining, or improving product quality, can call on Bridgeport's Technical Service for experienced advice. Local Bridgeport offices make all the arrangements.

Corrosion-Resistant Silicon—Bronze Screws Help Astragals to Exclude Wind and Weather

Physical properties of small parts can make big differences in the satisfactory service of assembled products.

Typical are the specially made screws of Bridgeport Silicon Bronze in adjustable astragals fitted to doors as weather strips and stop beads. Despite wear, weather, expansion and contraction, they enable flexible weatherstrip edges to exclude dirt, dust and drafts.



These screws are cold-headed by Time Screw & Manufacturing Corp., of Rockford, Ill., and are installed in extruded bronze astragals made by The Michaels Art Bronze Co., Covington, Ky.

All types of exterior doors must close tightly against weather and drafts. Adjustment must be easy when necessary. All materials must resist corrosion.

The screws, spaced 10 inches apart on a flexible edge held on the fixed member, have oval heads with two small lugs. The lugs, meshing into grooves in the fixed member, prevent vibration and loosening as the screws tension the edge against a steel spring.

Cold-headed from Bridgeport Silicon Bronze 609, these screws exemplify careful materials selection, matched with physical and end-use requirements. Physical properties of 609 satisfy severest demands. Cold-working properties simplify machining, reduce production cost.

Possessing the strength and toughness of mild steel and highly resistant to corrosion, 609 is approximately 98% copper and 2% silicon. This alloy is well suited to exposed installations.

When physical requirements are critical, Bridgeport alloys such as Silicon Bronze 609 often are recommended. These alloys can meet your production requirements, reduce manufacturing costs and contribute to greater product quality. (4388)

Bridgeport Brass Co.

BRIDGEPORT BRASS COMPANY ◆ BRIDGEPORT, CONNECTICUT

Mills at Bridgeport, Conn., Indianapolis, Ind., and Adrian, Mich. Sales Offices in Principal Cities—Conveniently Located Warehouses

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots 24.40, pigs 22.50. 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 26.20; No. 43, 5% Si, 26.00; 142, 4% Cu, 1.5% Mg, 2% Ni, 28.20; No. 195, 4.5% Cu, 0.8% Si, 27.60; No. 214, 3.8% Mg, 27.80; No. 356, 7% Si, 0.3% Mg, 26.20.

Antimony: R.M.M. brand, 99.5%, 33.00, Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.50, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb, deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 43.00 deld. Conn. Valley; 43.00 deld. Midwest; custom smelters, 46.00-46.50 deld.; Lake, 43.00 deld.; Fire refined, 42.75 deld.

Germanium: 99.9%, $295 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$120 nom, per troy oz.

Lead: Common, 15.30, chemical, 15.40, corroding, 15.40, St. Louis, New York basis, add 0.20.

Lithium: 99%+, cups, or ingot, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: 99.8%, self-palletizing pig, 32.50; notched ingot, 33.25, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40 for pig and 1.45 for ingot; for Madison, Ill., add 1.20 for pig and 1.25 for ingot; for Los Angeles, add 2.00 for both pig and ingot. Sticks 1.3 in. diameter, 53.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, G, H and R, 36.00; alloy M, 38.00, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., add 1.40; for Madison, Ill., add 0.50; for Los Angeles, add 2.50.

Mercury: Open market, spot, New York, $278-$285 per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced, $3-$3.25 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100, nom., per troy oz.

Palladium: $22-$24 per troy oz.

Platinum: $97-$112 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $9-$10 per lb.

Silver: Open market, 91.625 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot 98.875; prompt, 98.75.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.75, grade A-2 (0.5% Fe max), $3.25 per pound.

Tungsten: Powder, 98.8%, carbon, reduced, 1000-lb lots, $4.50 per lb, nom., f.o.b. shipping point; less than 1000 lb add 15.00; 99+% hydrogen reduced, $4.65. Treated ingots, $6.70.

Zinc: Prime Western, 13.00; brass special, 13.25; intermediate, 13.50, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.35; special high grade 14.50-14.75, deld. Diecasting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, $10 per lb. Powder electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 31.50-33.50; No. 12 foundry alloy (No. 2 grade) 30.50-30.75; 5% silicon alloy, 0.60 Cu max, 32.00-32.75; 13 alloy, 0.60 Cu max, 32.00-32.75; 195 alloy, 32.00-32.75; 108 alloy, 30.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 31.25-32.25; grade 2, 30.25-31.25; grade 3, 29.50-30.50; grade 4, 29.00-30.00.

Brass Ingot: Red brass No. 115, 41.00; tin bronze No. 225, 54.00; No. 245, 47.25; high-leaded tin bronze No. 305, 44.75; No. 1 yellow No. 405, 32.75; manganese bronze No. 421, 36.25.

Magnesium Alloy Ingot: AZ63A, 34.00; AZ91B, 34.00; AZ91C, 34.00; AZ92A, 34.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.84; rod, bar, wire, $1.81.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000-lb lots, 48.35; 30,000-lb lots 48.88; l.c.l., 48.98. Weatherproof, 100,000-lb lots, 46.03; 30,000-lb lots, 46.28; l.c.l, 46.78. Magnetic wire deld., 15,000 lb or more, 55.52; l.c.l., 56.27.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21 per cwt; pipe, full coils, $21 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $14.00-$14.50; sheared mill plate, $11.00; strip, $14.00-$14.50; wire, $10.00-$10.50; forging billets, $8.75; hot-rolled and forged bars, $8.75.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 23.00; ribbon zinc in coils, 20.50; plates 19.50-22.25.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes H.R.	87	74	93
Seamless Tubes	122	110	153
Shot, Blocks		71	

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	67.9	66.4		
0.156-0.172	57.5	55.9		
0.188	57.5	55.9		71.7
0.219-0.234	54.5	52.9		
0.250-0.281	54.5	52.9		68.4
0.313	54.5	52.9		65.2
Cold-finished				
0.375-0.547	53.4	51.4	63.7	61.3
0.563-0.688	53.4	51.4	60.6	57.5
0.750-1.000	52.1	50.1	55.4	54.2
1.063	52.1	50.1		52.3
1.125-1.500	50.1	48.2	53.6	52.3
Rolled				
1.563	48.8	46.9		
1.625-2.000	48.2	46.2		50.5
2.125-2.500	47.0	45.0		
2.563-3.375	45.6	43.6		

ALUMINUM

Sheets and Circles: 1100 and 3003 mill fin (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coil Sh Circ
0.249-0.136	37.5	42.3	...	
0.135-0.096	38.0	43.2	...	
0.095-0.077	38.7	44.2	36.1	
0.076-0.061	39.3	45.1	36.3	
0.060-0.048	39.9	45.6	36.7	
0.047-0.038	40.4	46.5	37.2	
0.037-0.030	40.8	47.0	37.6	
0.029-0.024	41.4	47.5	37.9	
0.023-0.019	42.2	49.0	38.8	
0.018-0.017	43.0	...	39.4	
0.016-0.015	43.9	...	40.2	
0.014	44.9	...	41.2	
0.013-0.012	46.1	...	41.9	
0.011	47.1	...	43.1	
0.010-0.0095	48.4	...	44.3	
0.009-0.0085	49.7	...	45.8	
0.008-0.0075	51.3	...	47.0	
0.007	52.8	...	48.5	
0.006	54.4	...	49.9	

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 24-60 in. width or diam. 72-240 in. length

Alloy	Plate Base	Circle B
1100-F, 3003-F	36.5	40.8
5050-F	37.6	41.9
3004-F	38.6	43.8
5052-F	39.9	45.2
6061-T6	41.1	46.6
2024-T4*	43.6	49.9
7075-T6*	51.4	58.5

*24-48 in. widths or diam, 72-180 in. leng

ALUMINUM

Forging Stock: Round, Class 1, 39.10-5 in specific lengths 36-144 in., diameters 0.3 8 in. Rectangles and squares, Class 1, 43. 56.20 in random lengths, 0.375-4 in. th widths 0.750-10 in.

Pipe: ASA. Schedule 40, alloy 6063-T6, 2 lengths, plain ends, 90,000-lb base, per 100

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$16.85	2	$ 5
1	26.50	4	14
1¼	35.85	6	25
1½	42.90	8	38

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032 99c; 0.064 in., 78.00c; 0.125 in., 63.50c, 30. lb and over, f.o.b. mill.

Plate: AZ31, 61.00c, 30,000 lb or more, 0. in. and over, widths 24-60 in., lengths 72- in.; tread plate, 64.00c, 30,000 lb or more, in. thick, widths 24-60 in., lengths 60-192 tooling plate 66.00c, 30,000 lbs or more, .2 3.000 in., widths 60-72 in., lengths 72-180

Extrusions: AZ31 commercial grade, rect gles, ¼ x 2 in., 64.70c; 1 x 4 in., 69.50c. R 1 in., 61.50c; 2 in., 59.00c. Tubing, 1 in. x 0.065 in., 82.50c; Angles, 1 x 1 x ⅛- 68.40c; 2 x 2 x ¼-in., 62.50c. Channels in., 63.40c. I-beams, 5 in., 62.70c.

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots

Aluminum: 1100 clippings, 19.50-20.00; sheets 16.50-17.25; borings and turnings, 11 11.50; crankcases, 16.50-17.25; industrial c ings 16.50-17.25.

Copper and Brass: No. 1 heavy copper wire, 38.00-38.50; No. 2 heavy copper wire, 35.50-36.00; light copper, 33.00-33 No. 1 composition red brass, 29.50-30.00; 1 composition turnings, 28.50-29.00; ye

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Cle Turni
Copper	62.76-63.13b	60.36c	....	62,82–63.32	39.000	39.000	38.
Yellow Brass	52.27	42.41d	52.81	55.18	28.875	28.625	26.
Red Brass, 85%	58.09	58.03	58.63	60.90	34.250	34.000	33.
Low Brass, 80%	56.55	56.49	57.09	59.36	32.750	32.250	31.
Naval Brass	55.63	49.94	62.69	58.79	26.750	26.500	26.
Com. Bronze, 90%	60.18	60.12	60.72	62.74	35.750	35.500	35.
Nickel Silver, 10%	66.00	68.33g	68.33	....	32.500	32.250	16.
Phos. Bronze, A, 5%	80.99	81.49	81.49	82.67	39.250	39.000	38.
Silicon Bronze	66.54	65.73	66.58	68.68e	37.625	37.375	36.
Manganese Bronze	59.37-59.45	53.38-53.47	63.82	....	27.000	26.750	26.
Muntz Metal	53.74	49.55	....	....	27.000	26.750	26.

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-dra d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipp point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Lead

rass turnings, 15.50-16.00; new brass clippings, 25.00-25.50; light brass, 17.00-17.50; eavy yellow brass, 20.00-20.50; new brass od ends, 23.50-24.00; auto radiators, unweated, 23.50-24.00; cocks and faucets, 23.50-4.00; brass pipe, 23.50-24.50.

ead: Heavy, 12.00-12.50; battery plates, 6.50-.75; linotype and stereotype, 13.25-14.25; electrotype, 12.00-12.75; mixed babbitt, 14.50.

lagnesium: Clippings, 18.50-19.50; clean castngs, 18.00-19.00; iron castings, not over 10% emovable Fe, less full deduction for Fe, 16.00-7.00.

lonel: Clippings, 54.50-60.00; old sheets, 5.00-50.00; turnings, 44.00; rods, 54.50-60.00.

ickel: Sheets and clips, 90.00-125.00; rolled nodes, 90.00-125.00; turnings, 75.00-100.00; od ends, 90.00-125.00.

inc: Old zinc, 5.00-6.00; new die-cast scrap, .00-5.75; old die-cast scrap, 3.25-3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

luminum: 1100 clippings, 23.00; 3003 clipings, 22.75-23.00; 6151 clippings, 22.50-23.00; 052 clippings, 22.50-23.00; 2014 clippings, 2.00-22.50; 2017 clippings, 22.00-22.50; 2024 lippings, 22.00-22.50; mixed clippings, 22.00-2.50; old sheet, 19.50-20.00; old cast, 20.00-0.50; clean old cable (free of steel), 23.00; orings and turnings, 20.00-21.00.

eryllium Copper: Heavy scrap, 0.020-in. and eavier, not less than 1.5% Be, 65.00; light crap, 60.00; turnings and borings, 43.00-55.00.

opper and Brass: No. 1 heavy copper and ire, 40.50; No. 2 heavy copper and wire, 9.00; light copper, 36.75; refinery brass (60% opper) per dry copper content, 37.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

opper and Brass: No. 1 heavy copper and ire, 40.50; No. 2 heavy copper and wire, 9.00; light copper, 36.75; No. 1 composition orings, 32.50-33.50; No. 1 composition solids, 3.50-34.00; heavy yellow brass solids, 22.50-3.00; yellow brass turnings, 21.50; radiators, 3.00.

PLATING MATERIAL

F.o.b. shipping point, freight allowed on uantities)

ANODES

admium: Special or patented shapes, $1.70 er lb.

opper: Flat-rolled, 59.42-59.79, oval, 58.92, 000-10,000 lb; electrodeposited, 56.78, 2000-000 lb lots; cast 62.54, 5000-10,000 lb quanti-

ickel: Depolarized, less than 100 lb, $1.015; 0-499 lb, 99.50; 500-4999 lb, 95.50; 5000-,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, educt 3 cents a lb. All prices eastern delivery ffective Jan. 1, 1955.

in: Bar or slab, less than 200 lb, $1.175; 0-499 lb, $1.16; 500-999 lb, $1.155; 1000 lb more, $1.15.

inc: Balls, 21.00; flat tops, 21.00; flats, 2.75; ovals, 22.00, ton lots.

CHEMICALS

admium Oxide: $2.15 per lb, in 100-lb drums.

hromic Acid: Less than 10,000 lb, 28.50; over ,000 lb, 27.50.

opper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 0 lb, 84.25; 400-900 lb, 85.50; 1000 lb, 81.50.

opper Sulphate: 500-1900 lb, 17.90; 2000-5900 , 15.90; 6000 lb or more, 15.65.

ickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 0 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 , 39.50; 10,000 lb and over, 38.50. All prices stern delivery, effective Jan. 1, 1955.

ickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 00 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 , 31.25; 36,000 lb, 30.25. All prices eastern elivery, effective Jan. 1, 1955.

lver Cyanide: (Cents per ounce) 4-oz bottle, .875; 16-oz bottle, 85.625; 80-oz bottle, .125; 100-oz bottle, 83.125; f.o.b. St. Louis, ew York and Los Angeles. Effective Sept. , 1955.

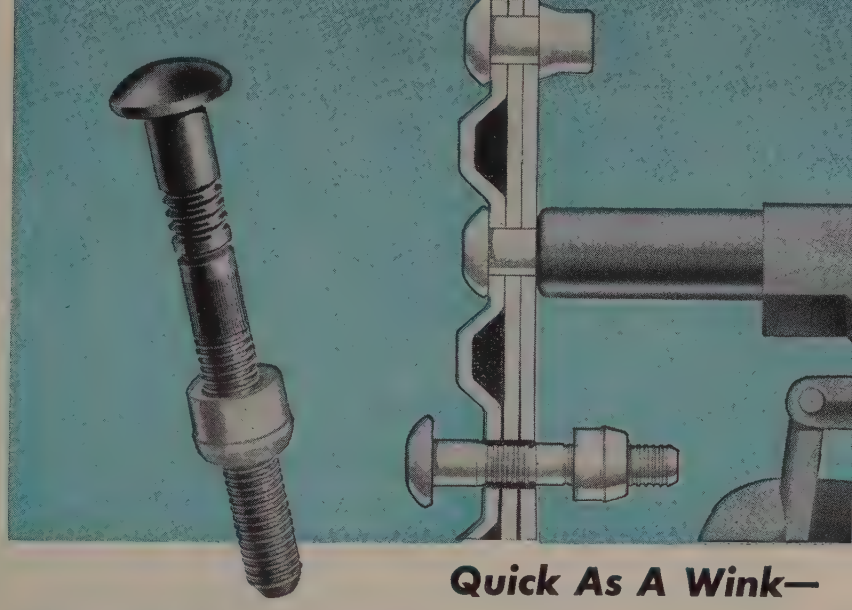
odium Cyanide: Egg, under 1000 lb, 19.80; 00-19,900 lb, 18.80; 20,000 lb and over, .80; granular, add 1-cent premium to above.

odium Stannate: Less than 100 lb, 74.00; 100-0 lb, 59.60; 700-1900 lb, 57.10; 2000-9900 , 55.30; 10,000 lb or more, 54.20.

annous Chloride (Anhydrous): Less than 50 , $1.606; 50 lb, $1.266; 100-300 lb, $1.116; 0-900 lb, $1.092; 1000-1900 lb, $1.068; 2000-00 lb, $1.031; 5000-19,900 lb, 97.00; 20,000 or more, 90.90.

annous Sulphate: Less than 50 lb, $1.304; lb, $1.004; 100-1900 lb, 98.40; 2000 lb or ore, 96.40.

nc Cyanide: Under 1000 lb, 54.30; 1000 lb d over, 52.30.



Quick As A Wink—
You Get Secure, Permanent Fastening With Townsend Lockbolts

In less than a second, with one squeeze of the trigger, a Townsend lockbolt pulls the work together with a high clinching action, is locked in place with uniform pressure. It is a quick method of producing tight, rigid, permanent fastenings that cannot loosen even under extreme vibration or shock conditions.

Townsend lockbolts combine the advantages of riveting and bolting—eliminate the disadvantages. Installation is fast—under certain conditions, one man will install 30 in only 60 seconds. Fewer workers will complete an assembly in less time than when riveting or bolting.

The clamping action, or clinch, of Townsend lockbolts is higher than rivets—is more uniform than bolts and nuts. The lockbolt fills the hole better than other fasteners, thus making possible a more rigid joint and also providing an effective liquid seal.

The Townsend lockbolt consists of two precision-made parts—a pin and a collar. Locking grooves are provided on the pin into which the collar is swaged by the pneumatic gun. The pulling section of the pin breaks in tension at a predetermined point when the setting action is completed.

Townsend lockbolts are available in steel and aluminum alloy, in 3/16", 1/4", 5/16" and 3/8" diameters, in grip lengths ranging up to 2", in various head styles. For information on how to speed production, get tight, secure, permanent fastening with Townsend lockbolts, use the coupon below.

Licensed under Huck patent nos. RE 22,792; 2,114,493; 2,527,307; 2,531,048; 2,531,049.

THE FASTENING AUTHORITY

Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

Cherry Rivet Division • Santa Ana, California

TOWNSEND COMPANY
Sales Department
New Brighton, Pa.

Please send without obligation "Lockbolt" Bulletin TL-101.

Name_____ Title_____

Company_____

Street_____

City_____ Zone_____ State_____

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key on page 143. Key to footnotes, Page 145.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$65.50

INGOTS, Alloy (NT)

Detroit R7 .....$69.00
Houston S5 .....74.00
Midland,Pa. C18 .....69.00
Munhall,Pa. U5 .....69.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Aliquippa,Pa. J5 ....$68.50
Bessemer,Pa. U5 ....68.50
Bridgeport,Conn. N19..73.50
Buffalo R2 .....68.50
Clairton,Pa. U5 .....68.50
Ensley,Ala. T2 .....68.50
Fairfield,Ala. T2 .....68.50
Fontana,Calif. K1 ....76.00
Gary, Ind. U5 .....68.50
Johnstown,Pa. B2 ....68.50
Lackawanna,N.Y. B2 ..68.50
LoneStar,Tex. L6 ....74.50
Munhall, Pa. U5 .....68.50
Pittburgh J5 .....68.50
S.Chicago,Ill. R2, U5..68.50
S.Duquesne,Pa. U5 ...68.50
Youngstown R2 .....68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5 ....$84.50
Bessemer,Pa. U5 ....84.50
Bridgeport,Conn. N19..89.50
Buffalo R2 .....84.50
Canton,O. R2 .....86.50
Clairton,Pa. U5 .....84.50
Conshohocken,Pa. A3..89.50
Ensley,Ala. T2 .....84.50
Fairfield,Ala. T2 ....84.50
Fontana,Calif. K1 ....92.00
Gary,Ind. U5 .....84.50
Geneva,Utah C11 .....84.50
Houston S5 .....89.50
Johnstown,Pa. B2 ....84.50
Lackawanna,N.Y. B2..84.50
Los Angeles B3 .....94.00
Midland,Pa. C18 .....84.50
Munhall,Pa. U5 .....84.50
Pittsburgh J5 .....84.50
Seattle B3 .....98.00
S.Chicago R2,U5,W14..84.50
S.Duquesne,Pa. U5 ....84.50
S.SanFrancisco B3 ....94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$96.00
Buffalo R2 .....96.00
Canton,O. R2, T7 ...96.00
Conshohocken,Pa. A3..103.00
Detroit R7 .....96.00
Fontana,Calif. K1 ....115.00
Gary,Ind. U5 .....96.00
Houston S5 .....101.00
Ind.Harbor,Ind. Y1 ...96.00
Johnstown,Pa. B2 ....96.00
Lackawanna,N.Y. B2 ..96.00
LosAngeles B3 .....116.00
Massillon,O. R2 .....96.00
Midland,Pa. C18 .....96.00
Munhall,Pa. U5 .....96.00
S.Chicago R2,U5,W14..96.00
S.Duquesne,Pa. U5 ...96.00
Struthers,O. Y1 .....96.00
Warren,O. C17 .....96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$103.50
Canton,O. R2 .....103.50
Cleveland R2 .....103.50
Gary,Ind. U5 .....103.50
S.Chicago R2, W14 ...103.50
S.Duquesne,Pa. U5 ...103.50

SKELP

Aliquippa,Pa. J5 ....4.325
LoneStar,Tex. L6 ....4.625
Munhall,Pa. U5 .....4.225
SparrowsPoint,Md. B2..4.225
Warren,O. R2 .....4.225
Youngstown R2, U5 ...4.225

WIRE RODS

AlabamaCity,Ala. R2 ..5.025
Aliquippa,Pa. J5 .....5.025
Alton,Ill. L1 .....5.20
Buffalo B11, W12 ....5.025
Cleveland A7 .....5.025
Donora,Pa. A7 .....5.025
Fairfield,Ala. T2 .....5.025
Houston S5 .....5.275
IndianaHarbor,Ind. Y1.5.025
Johnstown,Pa. B2 ....5.025
Joliet,Ill. A7 .....5.025
KansasCity,Mo. S5 ....5.275
Kokomo,Ind. C16 .....5.125
LosAngeles B3 .....5.825
Minnequa,Colo. C10 ...5.275
Monessen,Pa. P7 .....5.025
N.Tonawanda,N.Y. B11.5.025
Pittsburg,Calif. C11 ...5.675
Portsmouth P12 .....5.025
Roebling,N.J. R5 .....5.125
S.Chicago,Ill. R2 .....5.025
SparrowsPoint,Md. B2..5.125
Sterling,Ill.(1) N15 ....5.025
Sterling,Ill. N15 .....5.125
Struthers,O. Y1 .....5.025
Worcester,Mass. A7 ...5.325

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....4.60
Aliquippa,Pa. J5 .....4.60
Bessemer,Ala. T2 .....4.60
Bethlehem,Pa. B2 .....4.65
Birmingham C15 .....4.60
Clairton,Pa. U5 .....4.60
Fairfield,Ala. T2 .....4.60
Fontana,Calif. K1 .....5.25
Gary,Ind. U5 .....4.60
Geneva,Utah C11 .....4.60
Houston S5 .....4.70
Ind.Harbor,Ind. I-2 ....4.60
Johnstown,Pa. B2 ....4.65
KansasCity,Mo. S5 ....4.70
Lackawanna,N.Y. B2 ....4.65
LosAngeles B3 .....5.30
Minnequa,Colo. C10 ....4.90
Munhall,Pa. U5 .....4.60
Niles,Calif. P1 .....4.90
Portland,Oreg. O4 ....5.35
Phoenixville,Pa. P4 ....5.15
Seattle B3 .....5.35
S.Chicago U5, W14 ....4.60
S.SanFrancisco B3 ....5.25
Torrance,Calif. C11 ....5.30
Weirton,W.Va. W6 ....4.60

Wide Flange

Bethlehem,Pa. B2 .....4.65
Clairton,Pa. U5 .....4.60
Fontana,Calif. K1 ....5.40
Lackawanna,N.Y. B2 ....4.65
Munhall,Pa. U5 .....4.60
Phoenixville,Pa. P4 ....5.15
S.Chicago,Ill. U5 .....4.60

Alloy Std. Shapes

Clairton,Pa. U5 .....5.65
Fontana,Calif. K1 .....7.30
Gary,Ind. U5 .....5.65
Houston S5 .....5.75
Munhall,Pa. U5 .....5.65
S.Chicago,Ill. U5 .....5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 .....6.75
Bessemer,Ala. T2 .....6.75
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.75
Fairfield,Ala. T2 .....6.75
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.75
Geneva,Utah C11 .....6.75
Houston S5 .....6.85
Ind.Harbor,Ind. I-2, Y1.6.75
Johnstown,Pa. B2 ....6.80
KansasCity,Mo. S5 ....6.85
Lackawanna,N.Y. B2 ..6.80
LosAngeles B3 .....7.45
Munhall,Pa. U5 .....6.75
Seattle B3 .....7.50
S.Chicago,Ill. U5, W14..6.75
S.SanFrancisco B3 ....7.40
Struthers,O. Y1 .....6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ....6.80
Lackawanna,N.Y. B2 ..6.80
Munhall,Pa. U5 .....6.75
S.Chicago,Ill. U5 .....6.75

PILING

BEARING PILES

Bethlehem,Pa. B2 .....4.65
Lackawanna,N.Y. B2 ..4.65
Munhall,Pa. U5 .....4.60
S.Chicago,Ill. U5 .....4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2 ....5.45
Lackawanna,N.Y. B2 ....5.45
Munhall,Pa. U5 .....5.45
S.Chicago,Ill. U5 .....5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.50
Aliquippa,Pa. J5 .....4.50
Ashland,Ky.(15) A10 ...4.50
Bessemer,Ala. T2 .....4.50
Bridgeport,Conn. N19 ..4.75
Buffalo R2 .....4.50
Clairton,Pa. U5 .....4.50
Claymont,Del. C22 ....4.80
Cleveland J5, R2 .....4.60
Coatesville,Pa. L7 ....4.80
Conshohocken,Pa. A3 ..4.50
Detroit M1 .....4.60
Ecorse,Mich. G5 .....4.60
Fairfield,Ala. T2 .....4.50
Fontana,Calif.(30) K1 ..5.15
Gary,Ind. U5 .....4.50
Geneva,Utah C11 .....4.50
GaniteCity,Ill. G4 ....4.70
Harrisburg,Pa. P4 .....5.10
Houston S5 .....4.60
Ind.Harbor,Ind. I-2, Y1.4.50
Johnstown,Pa. B2 ....4.50
Lackawanna,N.Y. B2 ..4.50
LoneStar,Tex. L6 .....4.85
Mansfield,O. E6 .....4.50
Minnequa,Colo. C10 ....5.35
Munhall,Pa. U5 .....4.50
Newport,Ky. N9 .....4.50
Pittsburgh J5 .....4.50
Riverdale,Ill. A1 .....4.50
Seattle B3 .....5.40
Sharon,Pa. S3 .....4.50
S.Chicago R2, U5, W14.4.50
SparrowsPoint,Md. B2 ..4.50
Steubenville,O. W10 ....4.50
Warren,O. R2 .....4.50
Weirton,W.Va. W6 ....4.50
Youngstown R2, U5, Y1.4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .....5.65
Fontana,Calif. K1 .....6.30
Geneva,Utah C11 .....5.65
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 .5.65

PLATES, Wrought Iron

Economy,Pa. B14 ....10.40

PLATES,High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.725
Bessemer,Ala. T2 .....6.725
Clairton,Pa. U5 .....6.725
Cleveland J5, R2 .....6.725
Claymont,Del. C22 ....6.725
Coatesville,Pa. L7 ....6.725
Conshohocken,Pa. A3 ..6.725
Ecorse,Mich. G5 .....6.825
Fairfield,Ala. T2 .....6.725
Fontana,Calif.(30) K1 .7.375
Gary,Ind. U5 .....6.725
Geneva,Utah C11 .....6.725
Houston S5 .....6.825
Ind.Harbor,Ind. I-2, Y1.6.725
Johnstown,Pa. B2 ....6.725
LosAngeles B3 .....7.625
Munhall,Pa. U5 .....6.725
Pittsburgh J5 .....6.725
Seattle B3 .....7.625
Sharon,Pa. S3 .....6.725
S.Chicago,Ill. U5, W14.6.725
SparrowsPoint,Md. B2..6.725
Youngstown U5, Y1 ...6.725

PLATES, Alloy

Bridgeport,Conn. N19 ...6.55
Claymont,Del. C22 ....6.30
Coatesville,Pa. L7 .....6.30
Fontana,Calif. K1 .....6.95
Gary,Ind. U5 .....6.30
Houston S5 .....6.40
Ind.Harbor,Ind. Y1 ....6.30
Johnstown,Pa. B2 .....6.30
Munhall,Pa. U5 .....6.30
Newport,Ky. N9 .....6.30
Seattle B3 .....7.20
Sharon,Pa. S3 .....6.30
S.Chicago,Ill. U5, W14..6.30
SparrowsPoint,Md. B2 ..6.30
Youngstown Y1 .....6.30

FLOOR PLATES

Cleveland J5 .....5.575
Conshohocken,Pa. A3 ..5.575
Harrisburg,Pa. P4 ....5.575
Ind.Harbor,Ind. I-2 ....5.575
Munhall,Pa. U5 .....5.575
S.Chicago,Ill. U5 .....5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10...4.75
Ashland l.c.l. (15) A10..5.25
Cleveland c.l. R2 .....5.10
Warren,O. c.l. R2 .....5.10

BARS

BARS, Hot-Rolled Carbon

Ala.City,Ala. R2 .....4.65
Aliquippa,Pa. J5 .....4.65
Alton,Ill. L1 .....4.85
Atlanta A11 .....4.85
Bessemer,Ala. T2 .....4.65
Birmingham C15 .....4.65
Bridgeport,Conn. N19 ..4.80
Buffalo R2 .....4.65
Canton,O. R2 .....4.75
Clairton,Pa. U5 .....4.65
Cleveland R2 .....4.65
Ecorse,Mich. G5 .....4.75
Emeryville,Calif. J7 ....5.40
Fairfield,Ala. T2 .....4.65
FairlessHills,Pa. U5 ....4.80
Fontana,Calif. K1 .....5.35
Gary,Ind. U5 .....4.65
Houston S5 .....4.90
Ind.Harbor,Ind. I-2, Y1.4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. P22 .....4.65
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.35
Massillon,O. R2 .....4.75
Midland,Pa. C18 .....4.65
Milton,Pa. M18 .....4.65
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.00
N.Tonawanda,N.Y. B11..4.65
Pittsburg,Calif. C11 ...5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
Seattle B3, N14 .....5.40
S.Chicago R2, U5, W14..4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFran.,Calif. B3 ...5.40
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Warren,O. R2 .....4.65
Weirton,W.Va. W6 ....4.65
Youngstown R2, U5 ....4.65

BARS, H.R. Leaded Alloy

Warren,O. C17 .....6.325

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2 ....5.575
Bridgeport,Conn. N19 ..5.725
Buffalo R2 .....5.575
Canton,O. R2, T7 ....5.575
Clairton,Pa. U5 .....5.575
Detroit R7 .....5.575
Ecorse,Mich. G5 .....5.675
Fontana,Calif. K1 .....6.625
FairlessHills,Pa. U5 ...5.725
Gary,Ind. U5 .....5.575
Houston S5 .....5.825
Ind.Harbor,Ind. I-2,Y1.5.575
Johnstown,Pa. B2 ....5.575
KansasCity,Mo. S5 ....5.825
Lackawanna,N.Y. B2 ..5.575
LosAngeles B3 .....6.625
Massillon,O. R2 .....5.575
Midland,Pa. C18 .....5.575
S.Chicago, R2, U5, W14.5.575
S.Duquesne,Pa. U5 ....5.575
Struthers,O. Y1 .....5.575
Warren,O. C17 .....5.575
Youngstown U5 .....5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....6.80
Bessemer,Ala. T2 .....6.80
Bethlehem,Pa. B2 .....6.80
Clairton,Pa. U5 .....6.80
Cleveland R2 .....6.80
Ecorse,Mich. G5 .....6.90
Fairfield,Ala. T2 .....6.80
Fontana,Calif. K1 .....7.50
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
Ind.Harb.,Ind. I-2, Y1 ..6.80
Johnstown,Pa. B2 ....6.80
KansasCity,Mo. S5 ....7.05
Lackawanna,N.Y. B2 ..6.80
LosAngeles B3 .....7.50
Pittsburgh J5 .....6.80
Seattle B3 .....7.55
S.Chicago W14 .....6.80
S.Duquesne,Pa. U5 ....6.80
S.SanFrancisco B3 ....7.55
Struthers,O. Y1 .....6.80
Warren,O. R2 .....6.80
Youngstown U5 .....6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa. B2 .....4.80

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....4.65
Atlanta A11 .....4.85
Fontana,Calif. K1 .....5.35
Niles,Calif. P1 .....5.00
Pittsburgh J5 .....4.
Portland,Oreg. O4 .....5.
SanFrancisco S7 .....5.

BAR SHAPES, Hot-Rolled All

Clairton,Pa. U5 .....5.
Gary,Ind. U5 .....5.
Houston S5 .....5.
KansasCity,Mo. S5 ....5.
Youngstown U5 .....5.

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18 ....8.3
Camden,N.J. P13 .....8.
Chicago W18 .....8.3
Cleveland C20 .....8.3
Monaca,Pa. S17 .....8.3
Newark,N.J. W18 .....8.
SpringCity,Pa. K3 .....8.
Warren,O. C17 .....8.3

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....5.
BeaverFalls,Pa. M12, R2 5.
Buffalo B5 .....5.
Camden,N.J. P13 .....6.
Carnegie,Pa. C12 .....5.
Chicago W18 .....5.
Cleveland A7, C20 ....5.
Detroit R7 .....5.
Detroit B5, P17 .....6.
Donora,Pa. A7 .....5.
Elyria,O. W18 .....5.
FranklinPark,Ill. N5 ...5.
Gary,Ind. R2 .....5.
GreenBay,Wis. F7 .....5.
Hammond,Ind. L2, M13.5.
Hartford,Conn. R2 ....6.
Harvey,Ill. B5 .....5.
LosAngeles R2, S30 ....7.
Mansfield,Mass. B5 ....6.
Massillon,O. R2, R8 ....5.
Midland,Pa. C18 .....5.
Monaca,Pa. S17 .....5.
Newark,N.J. W18 .....6.
NewCastle,Pa.(17) B4 ..5.
Pittsburgh J5 .....5.
Plymouth,Mich. P5 ....6.
Putnam,Conn. W18 ....6.
Readville,Mass. C14 ....6.
S.Chicago,Ill. W14 ....5.
SpringCity,Pa. K3 .....6.
Struthers,O. Y1 .....5.
Waukegan,Ill. A7 .....5.
Worcester,Mass. W19 ..6.
Youngstown F3, Y1 ....5.

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md. C19 ..5.

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....7.4
BeaverFalls,Pa.M12,R2 7.4
Bethlehem,Pa. B2 .....7.4
Buffalo B5 .....7.4
Camden,N.J. P13 .....7.
Canton,O. T7 .....7.4
Carnegie,Pa. C12 .....7.4
Chicago W18 .....7.4
Cleveland A7, C20 ....7.4
Detroit R7 .....7.4
Detroit B5, P17 .....7.4
Donora,Pa. A7 .....7.4
Elyria,O. W8 .....7.4
Gary,Ind. R2 .....7.4
GreenBay,Wis. F7 .....7.4
Hammond,Ind. L2, M13.7.4
Hartford,Conn. R2 ....7.4
Harvey,Ill. B5 .....7.4
Lackawanna,N.Y. B2 ..7.4
LosAngeles S30 9
Mansfield,Mass. B5 ...7.4
Massillon,O. R2, R8 ...7.4
Midland,Pa. C18 .....7.4
Monaca,Pa. S17 .....7.4
Newark,N.J. W18 .....7.
Plymouth,Mich. P5 ...7.4
S.Chicago W14 .....7.4
SpringCity,Pa. K3 .....7.
Struthers,O. Y1 .....7.4
Warren,O. C17 .....7.4
Waukegan,Ill. A7 .....7.4
Worcester,Mass. A7 ...7.4
Youngstown F3, Y1 ....7.4

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....4.
Atlanta A11 .....4.
Birmingham C15 .....4.
Buffalo R2 .....4.
Cleveland R2 .....4.
Ecorse,Mich. G5 .....4.
Emeryville,Calif. J7 ...5.
Fairfield,Ala. T2 .....4.
FairlessHills,Pa. U5 ....4.
Fontana,Calif. K1 .....5.
Ft.Worth,Tex.(42) T4 ..5.
Gary,Ind. U5 .....4.
Houston S5 .....4.

d.Harbor,Ind. I-2, Y1 4.65
nnstown,Pa. B2 ..... 4.65
liet,Ill. P22 ..... 4.65
nsasCity,Mo. S5 .... 4.90
ckawanna,N.Y. B2 .. 4.65
sAngeles B3 ..... 5.35
lton,Pa. M18 ..... 4.65
nnequa,Colo. C10 .... 5.10
les,Calif. P1 ..... 5.00
ttsburg,Calif. C11 .... 5.35
ttsburgh J5 ..... 4.65
rtland,Oreg. O4 ..... 5.40
ndSprings,Okla, S5 .. 5.15
attle B3, N14 ..... 5.40
Chicago R2 ..... 4.65
Duquesne,Pa., U5 .... 4.65
SanFrancisco B3 .... 5.40
arrowsPoint,Md. B2 .. 4.65
erling,Ill.(1) N15 .... 4.65
erling,Ill. N15 ..... 4.75
ruthers,O. Y1 ..... 4.65
rrance,Calif. C11 .... 5.35
ungstown R2, U5, Y1 4.65

RS, Reinforcing (Fabricated; to Consumers)

nnstown,Pa. ¼-1" B2 6.15
nsasCity,Kans. S5 .. 6.45
ckawanna,N.Y. B2 .. 6.17
rion,O. P11 ..... 5.90
ttsburgh U8 ..... 6.17
attle B3, N14 ..... 6.60
arrowsPt. ½-1" B2 .. 6.15
lliamsport, Pa. S19 .. 6.00

IL STEEL BARS

is,Pa.(3) J8 ..... 4.25
icagoHts.(3) C2, I-2 .. 4.65
icagoHts.(4) C2, I-2 .. 4.65
Worth,Tex.(26) T4 .. 5.10
nklin,Pa. (3) F5 .... 4.65
anklin,Pa.(4) F5 .... 4.65
rion,O.(3) P11 ..... 4.50
oline,Ill.(3) R2 ..... 4.65
nawanda(3) B12 .... 4.50
nawanda(4) B12 .... 4.65
lliamsport,Pa.(3) S19 4.65

RS, Wrought Iron

onomy,Pa.(S.R.)B14 11.50
onomy,Pa(D.R.)B14 14.30
onomy(Staybolt)B14 14.65
K.Rks. (S.R.) L5 .. 11.50
K.Rks. (D.R.) L5 .. 16.00
K.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ..... 4.325
Allenport,Pa. P7 ..... 4.325
Ashland,Ky.(8) A10 .. 4.325
Cleveland J5, R2 .... 4.325
Conshohocken,Pa. A3 .. 4.375
Detroit(8) M1 ..... 4.425
Dravosburg,Pa. U5 .... 4.325
Ecorse,Mich. G5 ..... 4.425
Fairfield,Ala. T2 ..... 4.325
FairlessHills,Pa. U5 .... 4.375
Fontana,Calif. K1 .... 5.075
Gary,Ind. U5 ..... 4.325
Geneva,Utah C11 .... 4.425
GraniteCity,Ill. G4 .... 4.525
Ind.Harbor,Ind. I-2, Y1 .. 4.325
Kokomo,Ind. C16 .... 4.425
Lackawanna,N.Y. B2 .. 4.325
Mansfield,O. E6, (37) .. 4.325
Munhall,Pa. U5 ..... 4.325
Newport,Ky.(8) N9 .... 4.325
Niles,O. N12 ..... 4.325
Pittsburg,Calif. C11 .... 5.025
Pittsburgh J5 ..... 4.325
Portsmouth,O. P12 .... 4.325
Riverdale,Ill. A1 .... 4.325
Sharon,Pa. S3 ..... 4.325
S.Chicago,Ill. W14 .... 4.325
SparrowsPoint,Md. B2 .. 4.325
Steubenville,O. W10 .. 4.325
Warren,O. R2 ..... 4.325
Weirton,W.Va. W6 .. 4.325
Youngstown U5, Y1 .. 4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 ..... 5.625
Kokomo,Ind. C16 .... 5.475
Niles,O. N12 ..... 5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 .... 7.20
Youngstown Y1 ..... 7.20

SHEETS, H.R.(14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 ..... 6.375
Conshohocken,Pa. A3 .. 6.425
Dravosburg,Pa. U5 .... 6.375
Ecorse,Mich. G5 .... 6.475
Fairfield,Ala. T2 .... 6.375
FairlessHills,Pa. U5 .... 6.425
Fontana,Calif. K1 .... 7.125
Gary,Ind. U5 ..... 6.375
Ind.Harbor,Ind. I-2, Y1 6.375
Lackawanna(35) B2 .. 6.375
Munhall,Pa. U5 ..... 6.375
Pittsburgh J5 ..... 6.375
Sharon,Pa. S3 ..... 6.375
S.Chicago,Ill. U5 .... 6.375
SparrowsPoint(36) B2 .. 6.375
Warren,O. R2 ..... 6.375
Weirton,W.Va. W6 .... 6.375
Youngstown U5, Y1 .... 6.375

SHEET, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 .. 4.575
Ind.Harbor,Ind. I-2 .... 4.575

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 ..... 5.325
Cleveland J5, R2 .... 5.325
Conshohocken,Pa. A3 .. 5.375
Dravosburg,Pa. U5 .... 5.325
Detroit M1 ..... 5.325
Ecorse,Mich. G5 ..... 5.425
Fairfield,Ala. T2 ..... 5.325
FairlessHills,Pa. U5 .. 5.375
Follansbee,W.Va. F4 .. 5.325
Fontana,Calif. K1 .... 6.425
Gary,Ind. U5 ..... 5.325
GraniteCity, Ill. G4 .... 5.525
Ind.Harbor,Ind. I-2, Y1 5.325
Lackawanna,N.Y. B2 .. 5.325
Mansfield,O. E6 ..... 5.325
Middletown,O. A10 .... 5.325
Newport,Ky. N9 ..... 5.325
Pittsburg,Calf. C11 .. 6.275
Pittsburgh J5 ..... 5.325
Portsmouth,O. P12 .... 5.325
SparrowsPoint,Md. B2. 5.325
Steubenville,O. W10 .. 5.325
Warren,O. R2 ..... 5.325
Weirton,W.Va. W6 .... 5.325
Youngstown Y1 ..... 5.325

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 .... 7.875
Dravosburg,Pa. U5 .. 7.875
Ecorse,Mich. G5 ..... 7.975
FairlessHills,Pa. U5 .. 7.925
Fontana,Calif. K1 .... 8.975
Gary,Ind. U5 ..... 7.875
IndianaHarbor,Ind. Y1 7.875
Lackawanna(37) B2 .. 7.875
Pittsburgh J5 ..... 7.875
SparrowsPoint(38) B2.. 7.875
Warren,O. R2 ..... 7.875
Weirton,W.Va. W6 .... 7.875
Youngstown Y1 ..... 7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 .... 5.825

SHEETS, Culvert (16 Gage)	Cu Alloy	Cu Fe
Ashland,Ky. A10	6.90	...
Canton,O.R2	6.10	6.55
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary,Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	6.20	...
MartinsFry. W10	6.10	...
Newport,Ky. N9	6.10	6.35
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 ..... 7.15
Gary,Ind. U5 ..... 6.35
MartinsFry.,O. W10 .... 6.35

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 ..... 5.85‡
Ashland,Ky. A10 ..... 5.85†
Canton,O. R2 ..... 5.85‡
Delphos,O. N16 ..... 6.60‡
Dover,O. R1 ..... 5.85‡
Dravosburg,Pa. U5 .... 5.85†
Fairfield,Ala. T2 ..... 5.85†
Gary,Ind. U5 ..... 5.85*
GraniteCity,Ill. G4 .... 6.05
Ind.Harbor,Ind. I-2 ... 5.85†
Kokomo,Ind. C16 ..... 5.95‡
MartinsFerry,O. W10 .. 5.85*
Middletown,O. A10 .... 5.85†
Newport,Ky. N9 ..... 5.85‡
Niles,O. N12 ..... 6.85‡
Pittsburg,Calif. C1 .... 6.60*
SparrowsPt.,Md. B2 .. 5.85†
Steubenville,O. W10 ... 5.85‡
Warren,O. R2 ..... 5.85†
Weirton,W.Va. W6 .... 5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 .... 6.575

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 .... 8.60
SparrowsPoint(39) B2 .. 8.60

SHEETS, Galvannealed Steel

Canton,O. R2 ..... 6.25
Dravosburg,Pa. U5 .... 6.25
Kokomo,Ind. C16 ..... 6.60
Newport,Ky. N9 ..... 6.25
Niles,O. N12 ..... 7.25

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 ..... 6.10
Middletown,O. A10 .... 6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 ..... 6.70
Niles,O.(28) R2 ..... 6.70
Weirton,W.Va. W6 .... 6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .8.50
Butler,Pa. A10 (type 2) .8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 ..... 5.90
Cleveland R2 ..... 5.90
Dravosburg,Pa. U5 .... 5.90
Gary,Ind. U5 ..... 5.90
GraniteCity,Ill. G4 .... 6.10
Ind.Harbor,Ind. I-2 .... 5.90
Middletown,O. A10 .... 5.90
Niles,O. N12 ..... 5.90
Youngstown Y1 ..... 5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ... 7.75
Ind.Harbor,Ind. I-2 .... 7.75
Yorkville,O. W10 ..... 7.75

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 ..... 6.25
Mansfield,O. E6 ..... 6.25
Middletown,O. A10 .... 6.25
Niles,O. N12 ..... 6.25
Weirton,W.Va. W6 .... 6.25

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ... 6.65

Key to Producers

Acme Steel Co.
Alan Wood Steel Co.
Allegheny Ludlum Steel
Alloy Metal Wire Div., H. K. Porter Co. Inc.
American Shim Steel Co.
American Steel & Wire Div., U. S. Steel Corp.
Anchor Drawn Steel Co.
Angell Nail & Chaplet
Armco Steel Corp.
Atlantic Steel Co.

Babcock & Wilcox Co.
Bethlehem Steel Co.
Beth. Pac. Coast Steel
Blair Strip Steel Co.
Bliss & Laughlin Inc.
Braeburn Alloy Steel
Brainard Steel Div., Sharon Steel Corp.
E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
Buffalo Steel Division H. K. Porter Co. Inc.
A. M. Byers Co.
J. Bishop & Co.

Calstrip Steel Corp.
Calumet Steel Div. Borg-Warner Corp.
Carpenter Steel Co.
Cleve. Cold Rolling Mills
Cold Metal Products Co.
Colonial Steel Co.
Colorado Fuel & Iron
Columbia-Geneva Steel
Columbia Steel & Shaft.
Columbia Tool Steel Co.
Compressed Steel Shaft.
Connors Steel Div. H. K. Porter Co. Inc.
Continental Steel Corp.
Copperweld Steel Co.
Crucible Steel Co.
Cumberland Steel Co.

C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 NewEng.HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div. Sharon Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div. U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Division, H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Whickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2 ..4.325
Allenport,Pa. P7 .....4.325
Alton,Ill. L1 .....4.50
Ashland,Ky.(8) A10 ..4.325
Atlanta A11 .....4.525
Bessemer,Ala. T2 ....4.325
Birmingham C15 .....4.325
Bridgeport,Conn. N19..4.625
Buffalo(27) R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit M1 .....4.425
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
Fontana,Calif. K1 ....5.075
Gary,Ind. U5 .....4.325
Ind.Harbor,Ind. I-2, Y1.4.325
Johnstown,Pa.(25) B2..4.325
Lackaw'na,N.Y.(24) B2 4.325
LosAngeles(25) B3 ....5.075
Milton,Pa. M18 .....4.325
Minnequa,Colo. C10 ..5.425
NewBritain(10) S15 ..4.325
N.Tonawanda,N.Y. B11 4.325
Pittsburg,Calif. C11 ..5.075
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.325
SanFrancisco S7 .....5.05
Seattle(25) B3 .....5.325
Seattle N14 .....5.40
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
S.SanFrancisco(25) B3.5.075
SparrowsPoint,Md. B2..4.325
Sterling(1) N15 .....4.325
Sterling,Ill. N15 .....4.425
Torrance,Calif. C11 ...5.075
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5 .....4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19 ..7.50
Carnegie,Pa. S18 .....7.20
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 .....7.20
Ind.Harbor,Ind. Y1 ....7.20
LosAngeles B3 .....8.40
Newport,Ky. N9 .....7.20
Sharon,Pa. S3 .....7.20
S.Chicago W14 .....7.20
Youngstown U5, Y1 ....7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2 ....6.425
Conshohocken,Pa. A3 ..6.425
Ecorse,Mich. G5 .....6.525
Fairfield,Ala. T2 .....6.425
Fontana,Calif. K1 ....7.525
Gary,Ind. U5 .....6.425
Houston S5 .....6.675
Ind.Harbor,Ind. I-2, Y1 6.425
KansasCity,Mo. S5 ....6.675
Lackawanna,N.Y. B2 ..6.425
LosAngeles(25) B3 ....7.175
Seattle(25) B3 .....7.425
Sharon,Pa. S3 .....6.425
S.SanFrancisco(25) B3.7.175
SparrowsPoint,Md. B2..6.425
Warren,O. R2 .....6.425
Weirton,W.Va. W6 ....6.425
Youngstown U5, Y1 ..6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10 ..4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6 ....6.25
Baltimore T6 .....6.25
Boston T6 .....6.80
Buffalo S40 .....6.25
Cleveland J5 .....6.25
Cleveland A7 .....6.25
Conshohocken,Pa. A3 ...6.30
Dearborn,Mich. D3 ....6.35
Detroit D2, M1, P20 ...6.35
Dover,O. G6 .....6.25
Ecorse,Mich. G5 .....6.35
Follansbee,W.Va. F4 ..6.25
Fontana,Calif. K1 ....8.00
FranklinPark,Ill. T6 ...6.35
Ind.Harbor,Ind. I-2 ....6.35
Ind.Harbor,Ind. Y1 ....6.25
Indianapolis C8 .....6.40
Lackawanna,N.Y. B2 ..6.25
LosAngeles C1 .....8.50
NewBedford,Mass. R10..6.70
NewBritain(10) S15 ...6.25
NewCastle,Pa. B4, E5..6.25
NewHaven,Conn. A7 ....7.00
NewHaven,Conn. D2 ...6.70
NewKensington,Pa. A6..6.25
Pawtucket,R.I. R3 ....6.90
Pawtucket,R.I. N8 ....6.80
Pittsburgh J5 .....6.25
Portsmouth,O. P12 ....6.25
Riverdale,Ill. A1 .....6.35
Rome,N.Y.(32) R6 ....6.25
Sharon,Pa. S3 .....6.25
SparrowsPt.,Md. B2 ...6.25
Trenton,N.J.(31) R5 ...7.80
Wallingford,Conn. W2 ..6.70
Warren,O. R2, T5 ....6.25
Weirton,W.Va. W6 ....6.25
Worcester,Mass. A7 ....7.10
Youngstown Y1 .....6.25
Youngstown C8 .....6.25

STRIP, Cold-Rolled Alloy

Boston T6 .....13.80
Carnegie,Pa. S18 .....13.45
Cleveland A7 .....13.45
Dover,O. G6 .....13.45
FranklinPark,Ill. T6 ..13.45
Harrison,N.J. C18 ....13.45
Indianapolis C8 .....13.60
Pawtucket,R.I. N8 ....13.80
Sharon,Pa. S3 .....13.45
Worcester,Mass. A7 ..13.75
Youngstown C8 .....13.45

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7 .....9.10
Dearborn,Mich. D3 ....9.20
Dover,O. G6 .....9.30
Ecorse,Mich. G5 .....9.20

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.30	9.25	10.80	12.95	15.65
Boston T6	7.55	9.25	10.80	12.95	15.65
Bristol,Conn. W1	...	...	10.80	12.95	15.65
Carnegie,Pa. S18	...	8.95	10.50	12.65	....
Cleveland A7	7.00	8.95	10.50	12.65	15.35
Cleveland C7	...	8.95	10.50	12.65	15.35
Dearborn,Mich. D3	....	7.10	9.05	10.60	....
Detroit D2	....	7.10	9.05	10.60	12.75
Dover,O. G6	....	7.00	8.95	10.50	12.65
Follansbee,W.Va. F4	....	7.00	8.95	10.50**	....
FranklinPark,Ill. T6	....	7.10	8.95	10.50	12.65
Harrison,N.J. C18	....	...	...	10.80	12.95
Indianapolis C8	....	7.15	9.10	10.50	12.65
NewBritain,Conn.(10) S15.	....	7.00	8.95	10.50	12.65
NewCastle,Pa. B4, E5	....	7.00	8.95	10.50	12.65
NewHaven,Conn. D2	....	7.45	9.25	10.80	12.95
NewKensington,Pa. A6	..	7.00	8.95	10.50	....
NewYork W3	....	...	9.25	10.80	12.95
Pawtucket,R.I. N8	....	7.55	9.25	10.80	12.95
Riverdale,Ill. A1	....	7.10	8.95	10.50	12.65
Rome,N.Y.(32) R6	....	7.00	8.95	10.50	12.65
Sharon,Pa. S3	....	7.00	8.95	10.50	12.65
Trenton,N.J. R5	....	...	9.25	10.80	12.95
Wallingford,Conn. W2	...	7.45	9.25	10.80	12.95
Warren,O. T5	....	7.00	8.95	10.50	12.65
Weirton,W.Va. W6	....	7.00	8.95	10.50	12.65
Worcester,Mass. T6	....	7.55	9.25	10.80	12.95
Worcester,Mass. A7	....	7.85	9.25	10.80	12.95
Youngstown C8	....	7.00	8.95	10.50	12.65

**0.065 C, max.

Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	14.40	17.60	....
Buffalo, W12	...	...	14.40	....	....
FranklinPark,Ill. T6	...	...	14.90	18.10	21.50
Harrison,N.J. C18	...	...	14.40	17.60	21.00
NewYork W3	...	...	14.40	17.60	21.00
Trenton,N.J. R5	...	...	14.40	17.60	21.00
Worcester,Mass. A7, T6	...	...	14.40	17.60	21.00
Worcester,Mass. W12	...	...	14.40	....	....
Youngstown C8	...	...	14.75	17.95	21.35

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. N12	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.80*	9.80*	10.40*	11.40*	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	...	10.10†	10.70†	11.70†	12.60†
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60
Zanesville,O. A10	...	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	...	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80§	13.35§	13.85§	14.85§

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	13.55§
Butler,Pa. A10	....	....	17.45	17.95	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	13.55
Warren,O. R2	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3 .....6.55

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.05
Riverdale,Ill. A1 .....4.90
Sharon,Pa. S3 .....4.75
Youngstown U5 .....4.75

STRIP, Electrogalvanized

Cleveland A7 .....6.25*
Dover,O. G6 .....6.25*
Riverdale,Ill. A1 .....6.55*
Youngstown C8 .....6.25*
Warren,O. T5 .....6.25*
Warren,O. B9 .....6.45*
Weirton,W.Va. W6 ....5.75*
Worcester,Mass. A7 ...7.10*

*Plus galvanizing extras.

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.
Aliquippa,Pa. J5	$7.90	$8.15	
Dravosburg,Pa. U5	7.90	8.15	
Fairfield,Ala. T2	8.00	8.25	
FairlessHills,Pa. U5	8.00	8.25	
Gary,Ind. U5	7.90	8.15	
GraniteCity,Ill. G4	8.00	8.25	
IndianaHarbor,Ind. I-2, Y1	7.90	8.15	
Niles,O. R2	7.90	8.15	
Pittsburg,Calif. C11	8.65	8.90	
SparrowsPoint,Md. B2	8.00	8.25	
Weirton,W.Va. W6	7.90	8.15	
Yorkville,O. W10	7.90	8.15	

ELECTROTIN (22-27 Gage; Dollars per 100 lb)		
Aliquippa,Pa. J5	6.575	....
Niles,O. R2	7.075	7.275

TINPLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.20	$9.45
Dravosburg,Pa.U5	9.20	9.45
Fairfield,Ala. T2.	9.30	9.55
Fairless,Pa. U5..	9.30	9.55
Gary,Ind. U5	9.20	9.45
Ind.Har. I-2, Y1.	9.20	9.45
Pitts.,Calif. C11..	9.95	10.20
Sp.Pt.,Md. B2 ..	9.30	9.55
Weirton,W.Va. W6	9.20	9.45
Yorkville,O. W10.	9.20	9.45

BLACK PLATE, (Base Box)

Aliquippa,Pa. J5 .....$7.00
Dravosburg,Pa. U5 ....7.00
Fairfield,Ala. T2 .....7.10
FairlessHills,Pa. U5 ....7.10
Gary,Ind. U5 .....7.00
GraniteCity,Ill. G4 ....7.10
Ind.Harbor,Ind. I-2, Y1 7.00
Niles, O. R2 .....7.00
Pittsburg,Calif. C11 ...7.75
SparrowsPoint,Md. B2 .
Warren,O. R2 .....
Weirton,W.Va. W6 ...
Yorkville,O. W10 .....

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5 ...
Gary,Ind. U5 .....
GraniteCity,Ill. G4 ...
Ind.Harbor,Ind. Y1 ...
Yorkville,O. W10 .....

MANUFACTURING TERNES (Special Coated; Base

Dravosburg,Pa. U5 ...
Gary,Ind. U5 .....

MANUFACTURING TERNES (Light Coated, 6 lb; Base

Yorkville,O. W10 .....

ROOFING SHORT TERNES (8 lb Coated; Base Ba

Gary,Ind. U5 .....$

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2 ..6.25
Aliquippa,Pa. J5 .....6.25
Alton,Ill. L1 .....6.425
Atlanta A11 .....6.45
Bartonville,Ill. K4 ....6.35
Buffalo W12 .....6.25
Chicago W13 .....6.25
Cleveland A7 .....6.25
Crawfordsville,Ind. M8..6.35
Donora,Pa. A7 .....6.25
Duluth,Minn. A7 .....6.25
Fairfield,Ala. T2 .....6.25
Fostoria,O.(24) S1 ....6.45
Houston S5 .....6.50
Jacksonville,Fla. M8 ...6.77
Johnstown,Pa. B2 .....6.25
Joliet,Ill. A7 .....6.25
KansasCity,Mo. S5 ....6.50
Kokomo,Ind. C16 .....6.35
LosAngeles B3 .....7.20
Minnequa,Colo. C10 ....6.50
Monessen,Pa. P7 .....6.25
Newark 6-8 ga. I-1 ....6.90
N.Tonawanda B11 .....6.25
Palmer,Mass. W12 ....6.55
Pittsburgh,Calif. C11 ...7.20
Portsmouth,O. P12 ....6.25
Rankin,Pa. A7 .....6.25
S.Chicago,Ill. R2 .....6.25
S.SanFrancisco C10 ....7.20
SparrowsPoint,Md. B2 ..6.35
Sterling,Ill.(1) N15 ....6.25
Sterling,Ill. N15 .....6.35
Struthers,O. Y1 .....6.25
Waukegan,Ill. A7 .....6.25
Worcester,Mass. A7 ....6.55

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5 .....7.90
Alton,Ill. L1 .....8.075
Bartonville,Ill. K4 .....8.00
Buffalo W12 .....7.90
Cleveland A7 .....7.90
Donora,Pa. A7 .....7.90
Duluth,Minn. A7 .....7.90
Fostoria,O. S1 .....7.95
Johnstown,Pa. B2 .....7.90
LosAngeles B3 .....8.85
Milbury,Mass.(12) N6 ..8.20
Minnequa,Colo. C10 ....8.15
Monessen,Pa. P16 .....7.90
Muncie,Ind. I-7 .....8.10
Palmer,Mass. W12 ....8.20
Pittsburg,Calif. C11 ...8.85
Portsmouth,O. P12 ....7.90
Roebling,N.J. R5 .....8.20
S.Chicago,Ill. R2 .....7.90
S.SanFrancisco C10 ....8.85
SparrowsPt.,Md. B2 ...8.00
Struthers,O. Y1 .....7.90
Trenton,N.J. A7 .....8.20
Waukegan,Ill. A7 .....7.90
Worcester A7,J4,T6,W12.8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5 .....7.60
Alton,Ill. L1 .....
Buffalo W12 .....
Cleveland A7 .....
Donora,Pa. A7 .....
Duluth,Minn. A7 .....
Johnstown,Pa. B2 .....
KansasCity,Mo. S5 ...
LosAngeles B3 .....
Minnequa,Colo. C10 ..
Monessen,Pa. P16 .....
NewHaven,Conn. A7 ...
Palmer,Mass. W12 ....
Pittsburg,Calif. C11 ...
Portsmouth,O. P12 ....
Roebling,N.J. R5 .....
S.Chicago,Ill. R2 .....
S.SanFrancisco C10 ....
SparrowsPoint,Md. B2
Struthers,O. Y1 .....
Trenton,N.J. A7 .....
Waukegan,Ill. A7 .....
Worcester,Mass. A7 ....

WIRE, Fine & Weaving(8"

Alton,Ill. L1 1
Bartonville,Ill. K4 ....
Buffalo W12 .....
Chicago W13 .....
Cleveland A7 .....
Crawfordsville,Ind. M8.
Fostoria,O. S1 .....
Jacksonville,Fla. M8 ...
Johnstown,Pa. B2 .....
Kokomo,Ind. C16 .....
Minnequa,Colo. C10 ...
Monessen,Pa. P16 .....
Muncie,Ind. I-7 .....
Palmer,Mass. W12 ....
Roebling,N.J. R5 .....
S.SanFrancisco C10 ....
Waukegan,Ill. A7 .....
Worcester,Mass. A7,T6.

WIRE, Gal'd ACSR for Co

Bartonville,Ill. K4 ....
Buffalo W12 .....
Johnstown,Pa. B2 .....
Minnequa,Colo. C10 ...
Monessen,Pa. P16 .....
Muncie,Ind. I-7 .....
Pittsburg,Calif. C11 ...
Portsmouth,O. P12 ....
Roebling,N.J. R5 .....
SparrowsPt.,Md. B2 ...

ROPE WIRE

Bartonville,Ill. K4 ....
Buffalo W12 .....
Fostoria,O.(23) S1 ....
Johnstown,Pa. B2 .....
Monessen,Pa. P16 .....
Muncie,Ind. I-7 .....
Palmer,Mass. W12 ....
Portsmouth,O. P12 ....
Roebling,N.J. R5 .....
SparrowsPt. B2 .....
Struthers,O. Y1 .....
Worcester,Mass. J4 ....

(A) Plow and Mild ...
add 0.25c for Improved ...

WIRE
(Continued)

RE, Tire Bead
rtonville,Ill. K4 ....14.15
nessen,Pa. P16 ....14.20
oebling,N.J. R5 ....14.35

RE, Cold-Rolled Flat
nderson,Ind. G6 .....9.00
ltimore T6 .....9.30
ffalo W12 .....9.00
eveland A7 .....9.00
awfordsville,Ind. M8..9.00
ver,O. G6 .....9.00
storia,O. S1 .....9.00
anklinPark,Ill. T6 ...9.10
komo,Ind. C16 .....9.00
ssillon,O. R8 .....9.00
lwaukee C23 .....9.20
nessen,Pa. P16 .....9.00
wtucket,R.I. N8 ....9.30
verdale,Ill. A1 .....9.10
me,N.Y. R6 .....9.00
enton,N.J. R5 .....9.30
rcester A7, T6, W12..9.30

IL, Stock
To Dealers & Mfrs. (7) Col.
abamaCity,Ala. R2 ...152
quippa,Pa. J5 152
lanta A11 154
rtonville,Ill. K4 154
icago,Ill. W13 152
veland A9 157
awfordsville,Ind. M8 ..154
nora,Pa. A7 152
luth,Minn. A7 152
irfield,Ala. T2 152
lveston,Tex. D7 157
uston,Tex. S5 157
nstown,Pa. B2 152
let,Ill. A7 152
nsasCity,Mo. S5 157
komo,Ind. C16 154
nnequa,Colo. C10 157
nessen,Pa. P7 152
tsburg,Calif. C11 171
nkin,Pa. A7 152
hicago,Ill. R2 152
arrowsPt.,Md. B2 154
rling,Ill.(1) N15 152
rcester,Mass. A7 158

ILLS, CUT (100 lb keg)
To Dealers (33)
nshohocken,Pa. A3 ..$9.05
heeling,W.Va. W10 ..9.05

APLES, Polished Stock
To Dealers & Mfrs. (7) Col.
quippa,Pa. J5 152
lanta A11 154
rtonville,Ill. K4 154
awfordsville,Ind. M8 ..154
nora,Pa. A7 152
luth,Minn. A7 152
irfield,Ala. T2 152
nstown,Pa. B2 152
let,Ill. A7 152
komo,Ind. C16 154
nnequa,Colo. C10 157
nkin,Pa. A7 152
arrowsPt.,Md. B2 154
rling,Ill.(1) N15 152
rcester,Mass. A7 158

WIRE, Automatic Baler
(1½ Ga.) (Per 97 lb Net Box)
Coil No. 3150
abamaCity,Ala. R2 ..$9.35
rtonville,Ill. K4 ....9.45
ffalo W12 .....9.35
awfordsville,Ind. M8..9.46
nora,Pa. A7 .....9.35
luth,Minn. A7 .....9.35
nstown,Pa. B2 .....9.35
let,Ill. A7 .....9.35
komo,Ind. C16 .....9.45
sAngeles B3 .....10.14
nnequa,Colo. C10 ....9.60
tsburg,Calif. C11 ...10.43
hicago,Ill. R2 .....9.35
arrowsPt.,Md. B2 ....9.45
rling,Ill. N15 .....9.35

Coil No. 6500 Stand.
abamaCity,Ala. R2 ..$9.65
rtonville,Ill. K4 ....9.75
ffalo W12 .....9.60
awfordsville,Ind. M8..9.75
nora,Pa. A7 .....9.65
luth,Minn. A7 .....9.65
nstown,Pa. B3 .....9.65
let,Ill. A7 .....9.65
komo,Ind. C16 .....9.75
sAngeles B3 .....10.45
nnequa,Colo. C10 ....9.90
tsburg,Calif. C11 ...10.13
hicago Ill. R2 .....9.65
arrowsPt.,Md. B2 ....9.75
rling,Ill. N15 .....9.65

Coil No. 6500 Interim
abamaCity,Ala. R2 ..$9.70
rtonville,Ill. K4 ....9.80
ffalo W12 .....9.70

Crawfordsville,Ind. M8..9.80
Donora,Pa. A7 .....9.70
Duluth,Minn. A7 .....9.70
Johnstown,Pa. B2 .....9.70
Joliet,Ill. A7 .....9.70
Kokomo,Ind. C16 .....9.80
LosAngeles B3 .....10 50
Minnequa,Colo. C10 ...9.95
Pittsburg,Calif. C11 ..10.50
S.Chicago,Ill. R2 .....9.70
SparrowsPt.,Md. B2 ....9.80
Sterling,Ill. N15 .....9.70

WIRE, Barbed **Col.**
AlabamaCity,Ala. R2..175**
Aliquippa J5 .....172§
Atlanta A11 181
Bartonville,Ill. K4 181
Crawfordsville,Ind. M8 ..181
Donora,Pa. A7 .....175†
Duluth,Minn. A7 .....175†
Fairfield,Ala. T2 .....175†
Houston,Tex. S5 .....180†
Johnstown,Pa. B2 .....179*
Joliet,Ill. A7 .....175†
KansasCity,Mo. S5 .....180†
Kokomo,Ind. C16 .....177†
Minnequa,Colo. C10 ...180**
Monessen,Pa. P7 .....179*
Pittsburg,Calif. C11 ...195†
Rankin,Pa. A7 .....175†
S.Chicago,Ill. R2 .....175**
S.SanFrancisco C10 ...195**
SparrowsPoint,Md. B2..181*
Sterling,Ill.(1) N15 ....179*

WOVEN Fence, 9-15 ga. Col.
Ala.City,Ala. R2 ....162**
Ala.City, 17 ga. R2 ...241**
Ala.City, 18 ga. R2 ...251**
Aliq'ppa,Pa.9-14½ga J5 165§
Atlanta A11 168
Bartonville,Ill. K4 168
Crawfordsville,Ind. M8 ..168
Donora,Pa. A7 .....162†
Duluth,Minn. A7 .....162†
Fairfield,Ala. T2 .....162†
Houston,Tex. S5 .....167†
Johnstown,Pa.(43) B2 ..166
Joliet,Ill. A7 .....162†
KansasCity, Mo. S5 ....167†
Kokomo,Ind. C16 .....164†
Minnequa,Colo. C10 ..167**
Monessen,Pa. 9 ga. P17.166*
Pittsburg,Calif. C11 ...185†
Rankin,Pa. A7 .....162†
S.Chicago,Ill. R2 .....162**
Sterling,Ill.(1) N15 ....166*

Wire (16 Gage) Stone	An'ld Galv. Stone
Ala.City R2	14.50 16.05**
Bartonville K4	14.60 16.50
Buffalo W12	14.50 ....
Cleveland A7	14.50 ....
Crawf'dsville M8	14.60 16.50
Fostoria,O. S1	14.60 16.15†
Johnstown B2	14.15 16.40*
Kokomo C16	14.60 16.15†
Minnequa C10	14.75 16.45**
Palmer,Mass W12	14.50 16.05*
Pitts.,Calif. C11	14.85 16.40†
S.Chicago R2	14.50 16.05**
SparrowsPt. B2	14.60 16.50*
Sterling(1) N15	14.50 16.45††
Waukegan A7	14.50 16.05†
Worcester A7	14.80 ....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Galv.
Ala.City,Ala. R2	7.40 7.80**
Aliquippa J5	7.40 7.925§
Atlanta A11	7.50 8.075
Bartonville(48) K4	7.50 8.075
Buffalo W12	7.40 8.80†
Cleveland A7	7.40 ....
Crawfordsville M8	7.50 8.075
Donora,Pa. A7	7.40 7.80†
Duluth,Minn. A7	7.40 7.80†
Fairfield T2	7.40 7.80†
Houston,Tex. S5	7.65 8.05†
Jacks'ville,Fla. M8	7.90 8.475
Johnstown B2(48)	7.40 7.975*
Joliet,Ill. A7	7.40 7.80†
KansasCity,Mo. S5	7.65 8.05†
Kokomo C16	7.50 7.90†
LosAngeles B3	8.35 8.925*
Minnequa C10	7.65 8.05**
Monessen P7 (48)	7.40 7.975*
Palmer,Mass. W12	7.70 8.10†
Pitts.,Calif. C11	8.35 8.75†
Portsmouth,O. P12	7.40 ....
Rankin A7	7.40 7.80†
S.Chicago R2	7.40 7.80**
S.SanFran. C10	8.35 8.75**
Spar'wsPt.B2(48)	7.50 8.075*
Str'ling(1)(48)N15	7.40 8.00††
Struthers,O.(48)Y1	7.40 7.90†
Worcester,Mass.A7	7.70 ....

*Based on 12.50c zinc; †5c zinc; §10c zinc; ‡Less than 10c zinc; **Subject to zinc equalization extras. ††13c zinc.

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts
Full-Size Body (cut thread)
†1/2" x 6" and smaller 61
Larger than ½" diam. and all diams. longer than 6" 55
Under-Size Body (rolled thread; not nutted):
½" x 6" and smaller. 61

NUTS
Reg. & Heavy Square Nuts, all sizes 61
H. P. Reg. & Heavy Hex Nuts:
¾" & smaller 64
⅞" to 1⅛" incl. 63
1¼" to 1½" incl. 65
1⅝" & larger 61
C.P. Reg. & Heavy Hex Nuts
¾" & smaller 64
⅞" & larger 61
Semifinished & Finished Nuts
¾" & smaller 66
⅞" & larger 63
Semifinished Slotted Reg. & Heavy Hex Nuts
¾" & smaller 66
⅞" & larger 63
Hot Galvanized Nuts, all types
1⅛" & smaller 44
(On above items, add 25% for less than case quantities)

CAP SCREWS
(New Std., hexagon head, upset, packages)
Bright:
6" and shorter:
¼" through ½" diam. 34
⅝" & ⅝" diam. 31
¾", ⅞", 1" 8
Longer than 6"
¼" through ⅝" diam. 3
¾" through 1" diam..+13
High Carbon, Heat-treated:
6" and shorter:
¼" through ½" diam. 20
⅝" & ⅝" diam. 16
¾", ⅞", 1" .....+11
Longer than 6"
¼" through ⅝" diam.+23
¾" through 1" diam..+41
(New Std. Hexagon head, upset, bulk)
Bright:
½" x 6" & smaller & shorter 49
⅝" & ⅝" diam. x 6" & shorter 48
¾, ⅞". 1" x 6" & shorter 31
High Carbon, Heat-treated:
½" x 6" & smaller & shorter 41
⅝" x ⅝" diam. & 6" & shorter 39
¾", ⅞", 1" x 6" & shorter 20

MACHINE SCREW NUTS & STOVE BOLT NUTS (Bulk)
No. 2 to ⅜" incl., Square:
25,000 to 199,999 pieces 20
200,000 or more pieces 27
No. 2 to ⅜" incl., Hex.:
25 000 to 199.999 pieces 18
200,000 or more pieces 25

MACHINE SCREWS, SLOTTED (Bulk)
No. 2 to ¼" diam, incl.:
25,000 to 199,999 pieces 20
200 000 or more pieces 27
⅝" to ½" diam, incl.:
15.000 to 99,999 pieces 20
100,000 or more 27

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.42
1¼	13	....	24.94	20.45
1½	13	23.31	27.57	22.61
1¾	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2¼	12	37.73	44.63	36.60
2½	12	41.57	49.16	40.31
2¾	12	45.00	53.22	43.65
3	12	47.99	56.76	46.55

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	....	....	....
Huntington,W.Va. W7	....	....	....	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	....
Johnstown,Pa. B2	....	....	....(16)	5.65
Lackawanna,N.Y. B2	4.725	4.625	....	5.65
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	....
Williamsport,Pa. S19	....	....	....	5.65

TIE PLATES
Fairfield,Ala. T2 .....5.625
Gary,Ind. U5 .....5.625
Ind.Harbor,Ind. I-2 ...5.625
Lackawanna,N.Y. B2 ..5.625
Minnequa,Colo. C10 ...5.625
Seattle B3 .....5.775
Steelton,Pa. B2 .....5.625
Torrance,Calif. C11 ...5.775

TRACK BOLTS (20) Treated
Cleveland R2 .....12.40
KansasCity,Mo. S5 ....12.40
Lebanon,Pa. B2 .....12.40
Minnequa,Colo. C10 ...12.40
Pittsburgh O3, P14 ....12.40
Seattle B3 .....12.90

AXLES
Ind.Harbor,Ind. S13 ...7.25
Johnstown,Pa. B2 .....7.25

JOINT BARS
Bessemer,Pa. U5 ....5.825
Fairfield,Ala. T2 ....5.825
Ind.Harbor,Ind. I-2 ...5.825
Joliet,Ill. U5 .....5.825
Lackawanna,N.Y. B2 ..5.825
Minnequa,Colo. C10 ...5.825
Steelton,Pa. B2 .....5.825

SCREW SPIKES
Cleveland R2 .....11.90
Pittsburgh O3 .....11.90

STANDARD TRACK SPIKES
Fairfield,Ala. T2 .....7.90
Ind.Harbor,Ind. I-2, Y1.7.90
KansasCity,Mo. S5 ....7.90
Lebanon,Pa. B2 .....7.90
Minnequa,Colo. C10 ...7.90
Pittsburgh J5 .....7.90
Seattle B3 .....8.40
S.Chicago,Ill. R2 .....7.90
Struthers,O. Y1 .....7.90
Youngstown R2 .....7.90

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed. Unannealed:	9.25
Minus 100 mesh	11.75
Minus 35 mesh	8.25
Minus 20 mesh	9.00
Swedish, c.i.f. Camden, N. J., c.l. in bags.	9.50
Domestic (Swedish), f.o.b. Riverton, N.J., in bags	9.50
Canadian, fo.o.b. Shipping point	9.50
Electrolytic iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)..	31.00
Carbonyl Iron: 97.9-99.8% size 5 to 10 microns..83.00-148.00	
Aluminum: Atomized, 500 lb. drum frght. allowed Carlots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	38.00-50.00†
Bronze, 5000-lb lots	61.25-64.50†
Copper: Electrolytic	56.75
Reduced	56.75
Lead	22.80
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed ..	$1.00
Nickel-Silver, 5000-lb lots	58.75-61.50†
Phosphor-Bronze, ¼-ton lots	58.50
Silicon	47.50
Solder	7.00*
Stainless Steel, 302 ..	99.00
Stainless Steel, 316 ..	$1.32
Tin	14.50*
Zinc, 5000-lb lots	18.75-32.50‡
Tungsten Melting grade, 99% 60 to 200 mesh:	Dollars
1000 lb and over...	4.50
Less than 1000 lb..	4.65
Chromium, electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni, **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago Base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Mild plow, 10.55c.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bondcrized.
(29) Youngstown base.
(30) Sheared; for universal mill and 0.45c for carbon, add 0.40c for alloy and 0.45c H.S.-L.A.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.9
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.1
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk
Aliquippa, Pa. J5	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5
Ambridge, Pa. N2	6.5	..	10.5	...	13	...	14.5	...	14.5	...	14	...	16.5
Lorain, O. N3	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5
Youngstown Y1	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+10	10.5	+7.25	13	+4.75	14.5	+3.25	14.5	+3.25	14	+3.75	16.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.2
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk
Aliquippa, Pa. J5	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5
Alton, Ill. L1	...	...	....	....	....	....	15.5	+1.75	18.5	2.25	21	5.75	23.5
Benwood, W. Va. W10	16.5	+12	7.25	+18.25	+1.75	+26.25	17.5	0.25	20.5	4.75	23	7.75	25.5
Butler, Pa. F6	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...
Etna, Pa. N2	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5
Fairless Hills, Pa. N3	...	...	....	....	....	....	15.5	+1.75	18.5	2.75	21	5.75	23.5
Fontana, Calif. K1	...	...	....	....	....	....	6	+11.25	9	+7.25	11.5	+3.75	14
Ind. Harbor, Ind. Y1	...	...	....	....	....	....	16.5	+0.75	19.5	3.25	22	6.75	24.5
Lorain, O. N3	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5
Sharon, Pa. S4	17.5	+11	9	+16.5	0.5	+24	...	...	...	...	...	...	...
Sharon, Pa. M6	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5
Sparrows Pt., Md. B2	15.5	+13	7	+18.5	+1.5	+26	15.5	+1.75	18.5	2.25	21	5.75	23.5
Youngstown R2, Y1	...	...	....	....	....	....	17.5	0.25	20.5	4.25	23	7.75	25.5
Wheatland, Pa. W9	17.5	+11	9	+16.5	0.5	+24	17.5	0.25	20.5	4.25	23	7.75	25.5

Size—Inches	1½		2		2½		3		3½		4
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk
Aliquippa, Pa. J5	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....
Alton, Ill. L1	24	8	24.5	8.5	26	8.75	26	8.75	....	...	....
Benwood, W. Va. W10	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5
Etna, Pa. N2	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5
Fairless Hills, Pa. N3	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5
Fontana, Calif. K1	14.5	+1.5	15	+1	16.5	+0.75	16.5	+0.75	7	+10.75	7
Ind. Harbor, Ind. Y1	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5
Lorain, O. N3	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....
Sharon, Pa. M6	26	10	26.5	10.5	28	10.75	28	10.75	....	...	....
Sparrows Pt., Md. B2	24	8	24.5	8.5	26	8.75	26	8.75	16.5	+1.25	16.5
Youngstown R2, Y1	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5
Wheatland, Pa. W9	26	10	26.5	10.5	28	10.75	28	10.75	18.5	0.75	18.5

*Galvanized pipe discounts based on current price of zinc (13.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
201	17.00	21.50	....	....	31.00	....	....	42.25	39.00
202	18.25	24.00	31.00	36.25	33.50	36.75	38.75	42.50	42.50
301	17.75	22.25	....	36.75	32.00	38.00	....	44.25	41.00
302	19.00	24.75	32.00	37.25	34.50	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	41.00	....	....	....
304	20.25	26.00	33.75	39.00	37.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44.00	42.25	45.25	48.00	52.25	52.25
305	21.75	28.25	....	39.50	40.25	40.25	43.50	50.25	50.25
308	22.00	29.00	38.50	44.25	41.25	45.50	49.75	52.00	52.00
309	29.50	38.25	46.75	53.50	53.50	54.75	58.25	67.00	67.00
309S	31.50	41.00	51.00	59.00	58.50	60.25	63.75	74.00	74.00
310	37.25	48.00	62.25	72.25	68.50	73.50	75.25	78.75	78.75
314	....	....	....	....	....	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.75	63.25	65.75	69.25	73.25	73.25
317	37.25	48.25	62.75	72.75	73.50	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	45.25	49.25	54.25	54.25
18-8CbTa	29.25	38.00	45.75	52.25	53.25	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	34.00	36.25	....	44.00
405	17.50	23.00	26.75	31.00	32.25	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	31.00	....	....	....
420	23.50	30.25	31.00	36.00	37.75	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	31.00	32.25	36.75	36.75
430F	....	....	26.50	30.50	....	31.50	....	....	....
431	16.00	20.50	26.50	30.50	29.75	31.50	33.00	38.00	38.00
446	....	....	35.50	40.50	53.25	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co., Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates, Carbon Base 10%	Plates, Carbon Base 20%	Shee Carbon
Stainless:			
302	....	....	30
304	30.30	36.05	32
304-L	32.30	37.95	.
310	41.30	47.00	.
316	35.50	41.40	47
316-L	40.00	46.10	.
316-CB	41.15	48.45	.
321	32.00	37.75	37
347	34.40	41.40	48
405	25.80	33.35	.
410	25.30	32.85	.
430	25.30	32.85	.
Inconel	49.45	65.45	.
Nickel	41.05	55.65	.
Nickel, Low Carbon	43.25	60.05	.
Monel	42.35	56.35	.
Copper*	....	....	46

	Strip, Carbon Base, Cold Rolled 10%	Strip, Carbon Base, Cold Rolled Both
Copper*	30.00	35

*Deoxidized. Production points: Stainless-clad sh New Castle, Ind. I-4; stainless-clad plates, Claymont, C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and W ington, Pa. J3; nickel, inconel, monel-clad plates, Co ville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ p
Regular Carbon	0.275	5%Cr Hot Work	0.430
Extra Carbon	0.330	W-Cr Hot Work	....
Special Carbon	0.390	V-Cr Hot Work	....
Oil Hardening	0.430	Hi-Carbon-Cr	.....

Grade by Analysis (%)

W	Cr	V	Co	Mo	$
20.25	4.25	1.6	12.25	...	.....
18.25	4.25	1	4.75	...	..... 2.305
18	4	2	9	...	.... 2.675-2
18	4	2	....	...	.....
18	4	1	....	...	.....
13.75	3.75	2	5	...	.....
13.5	4	3	....	...	.....
9	3.5	..	....	...	.....
6	4	2	....	5	.....
6	4	3	....	6	.....
1.5	4	1	....	8.5	.....

Tool steel producers include: A4, A8, B2, B8, C4 C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

g Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

ingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
amaCity,Ala. R2	54.50	55.00‡	....	....
ingham R2	54.50	55.00‡	....	....
ingham U6	....	55.00‡	59.00	....
lward,Ala. W15	54.50	55.00‡	59.00	....
ncinnati, deld.	....	62.70	....	....
alo District				
alo H1, R2	58.50	59.00	59.50	60.00
wanda,N.Y. W12	58.50	59.00	59.50	60.00
nawanda,N.Y. T9	....	59.00	59.50	60.00
ston, deld.	69.15	69.65	70.15	....
chester,N.Y. deld.	61.52	62.02	62.52	....
racuse,N.Y. deld.	62.62	63.12	63.62	....
ago District				
ago I-3	58.50	59.00	59.00	59.50
,Ind. U5	58.50	....	59.00	....
icago R2	58.50	....	59.00	....
icago,Ill. Y1	58.50	59.00	59.00	59.50
icago,Ill. U5, W14	53.50	....	59.00	59.50
lwaukee, deld.	60.67	61.17	61.17	61.67
skegon,Mich. deld.	....	65.30	65.30	....
eland District				
eland A7, R2	58.50	59.00	59.00	59.50
ron,O., deld.	61.25	61.75	61.75	62.25
in,O. N3	58.50	....	....	59.50
Atlantic District				
lehem,Pa. B2	60.50	61.00	61.50	62.00
wYork, deld.	....	64.78	65.28	....
wark, deld.	63.52	64.02	64.52	65.02
sboro,Pa. B10	60.50	61.00	61.50	62.00
ter,Pa. P14	60.50	61.00	61.50	....
lladelphia, deld.	62.16	62.66	63.16	....
ton,Pa. B2	60.50	61.00	61.50	62.00
leland,Pa. A3	60.50	61.00	61.50	62.00
iladelphia, deld.	62.16	62.66	63.16	63.66
,N.Y. R2	60.50	61.00	61.50	62.00
burgh District				
lleIsland,Pa. P6	58.50	59.00	59.00	....
ttsburgh (N&S sides),				
Aliquippa, deld.	....	60.37	60.37	60.87
KeesRocks, deld.	....	60.04	60.04	60.54
wrenceville,Homestead,				
Wilmerding, Monaca, deld.	....	....	60.66	60.66	61.16
rona,Trafford, deld.	60.69	61.19	61.19	61.69
ackenridge, deld.	60.95	61.45	61.45	61.95
emer,Pa. U5	58.50	....	59.00	59.50
ton,Rankin,S.Duquesne,Pa. U5	58.50	....	....	....
eesport,Pa. N3	58.50	....	....	59.50
and,Pa. C18	58.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	59.00	....
Sharpsville,Pa. S6	58.50	....	59.00	59.50
Youngstown Y1	....	....	59.00	59.50
Youngstown U5	58.50	....	....	59.50
Mansfield,O., deld.	63.40	....	63.90	64.40
Duluth I-3	58.50	59.00	59.00	59.50
Erie,Pa. I-3	58.50	59.00	59.00	59.50
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	64.50	65.00	....	....
Geneva,Utah C11	58.50	59.00	....	....
GraniteCity,Ill. G4	60.40	60.90	61.40	....
Ironton,Utah C11	58.50	59.00	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	60.50	61.00	61.50	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	58.50	59.00	59.00	59.50
Cincinnati, deld.	64.26	64.76	....	....

*Phos. 0.51-0.75%; $56, Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	$67.50
Buffalo H1	68.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$85.50
Keokuk,Iowa, (Open-hearth & Fdry, freight allowed K2)	90.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	93.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Steelton,Pa. B2 (Phos. 0.035% max)	66.50
Philadelphia, deld.	70.05
Troy,N.Y. R2 (Phos. 0.035% max)	66.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	63.50

arehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 25 cents per 100 lb except: Buffalo, Cleveland, Erie, 30 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Birmingham, Chattanooga, Jackson, 15 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

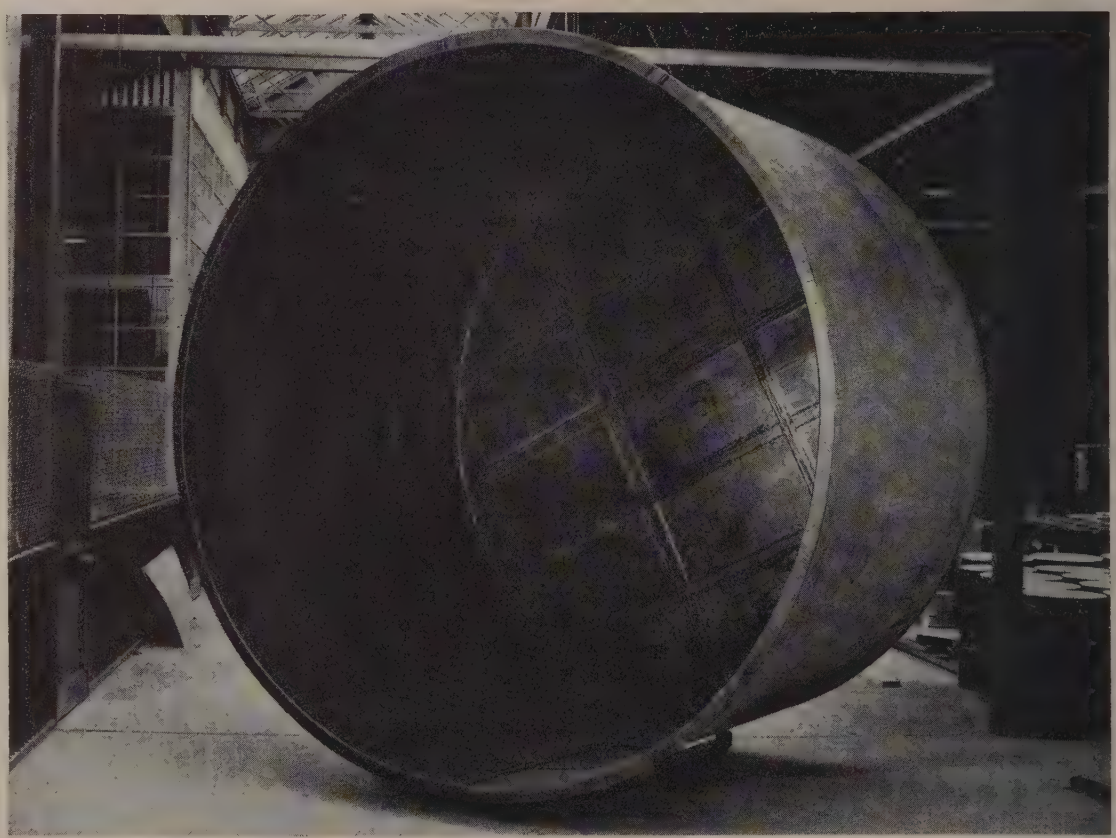
	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
nta	7.14	8.20	8.87	....	7.40	...	7.42	9.39	....	7.63	7.49	9.48
more	7.03	8.32	8.37	....	7.65	...	7.61	8.62[3]	13.44	7.93	7.21	8.87
ingham	6.80	7.90	8.85	....	7.06	...	7.08	9.35	....	7.28	6.99	9.10
on	7.70	8.81	10.27	45.67	7.96	...	7.83	9.53	14.45	8.13	7.89	9.36
alo	6.80	8.05	9.77	....	7.15	...	7.10	7.90	13.10	7.40	7.15	8.70
tanooga	6.95	8.10	8.60	....	7.20	...	7.20	9.18	....	7.45	7.25	9.05
ago	6.80	8.09	8.50	49.05	7.06	...	7.08	7.75	12.85	7.28	6.99	8.46
nnati	6.92	8.08	8.90	46.10	7.30	...	7.32	8.05	13.09	7.75	7.28	8.71
eland	6.80	8.09	8.85	49.16	7.16	...	7.14	7.85	12.91	7.61	7.16	8.63
oit	6.99	8.28	8.78	43.50	7.34	...	7.36	8.04	13.05	7.75	7.27	8.65
Pa.	6.80	7.90	8.85	....	7.15	...	7.08	7.85	....	7.40	7.15	8.63
ton	7.85	8.75	10.49	....	8.15	...	8.25	9.85	14.00	8.20	7.80	9.20
son, Miss.	7.10	8.20	9.20	....	7.40	...	7.40	9.44	....	7.60	7.45	9.30
Angeles	8.05	10.00	11.00	....	8.35	...	8.05	11.25	14.25	8.30	8.05	10.25
aukee	6.89	8.18	8.59	....	7.15	...	7.17	7.94	12.94	7.45	7.08	8.55
ne, Ill.	7.15	8.44	8.85	....	7.41	...	7.43	8.10	....	7.63	7.34	...
York	7.46	8.68	9.44	44.95	8.07	...	7.96	9.48	13.28	7.99	7.76	9.19
olk, Va.	7.25	...	...	....	7.65	...	7.65	9.50	....	7.95	7.45	8.95
delphia	7.14	8.42	9.35	45.98	7.67	9.02	7.64	8.46	13.16	7.74	7.37	8.69**
burgh	6.80	8.09	9.20	49.00	7.16	...	7.08	7.85	12.85	7.28	6.99	8.46
land, Oreg.	7.80	8.80	10.65	....	8.00	...	7.95	12.20	15.00	7.85	7.75	9.60
mond, Va.	7.00	...	9.47	....	7.65	...	7.70	8.85	....	7.95	7.20	9.10
Louis	7.09	8.38	9.19	43.89	7.35	...	7.37	8.14	13.14	7.68	7.28	8.75
Paul	7.46	8.59	9.16	....	7.72	...	7.74	8.51	13.51	7.94	7.65	9.12
Francisco	8.10	9.65	10.15	51.65	8.35	...	8.05	11.20	14.25[3]	8.25	8.05	10.25
tle	8.55	10.40	10.80	54.00	8.65	...	8.35	11.70	14.60	8.30	8.20	10.10
ane	8.55	11.00[7]	10.80	....	9.05	...	8.35	11.80	15.35	8.30	8.20	10.60
hington	7.50	8.79	7.97	....	8.12	...	8.08	9.09	....	8.40	7.68	9.34

Prices do not include gage extras; †prices include gage and coating extras (based on 12.50-cent zinc), except in Birmingham (coating extra ex-ed); ‡includes 35-cent special bar quality extras; **⅛-in. and heavier; ††as annealed; §§under ½-in.
Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and os Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; rolled products on West Coast, 2000 to 9999 lb; [2]—500 to 9999 lb; [3]—400 to 999 lb; [4]—4000 lb and over; [5]—1000 to 1999 lb; [6]—1000 lb and over; 500 to 3999 lb; [8]—2000 to 3999 lb; [9]—f.o.b. local delivery in lots of 10,000 lb and over.

HERECROL

REG. U. S. PAT. OFF.

Self-curing SYNTHETIC RUBBER SHEET LINING



The CARBON STEEL TANK shown above was HERECROL lined in our shops and later installed in a Wisconsin Paper Mill for liquid alum storage. HERECROL Sheet Lining is available in ⅛″ and 3/16″ thickness. Application may be accomplished in the field as well as in our shop. The following is a selection of solutions which can safely be handled in HERECROL lined equipment:

ALUM SOLUTIONS • AMMONIA SOLUTIONS
COPPER SULFATE • FERRIC SULFATE
HYDROCHLORIC ACID • HYDROFLUORIC ACID
NITRIC ACID • SODIUM HYDROXIDE
PHOSPHORIC ACID • NICKEL SULFATE
ZINC CHLORIDE • ZINC SULFATE

The HERECROL Self-Curing Synthetic Rubber Sheet Lining can be applied to steel tanks and other equipment unlimited in size. The reason for this is that no special equipment to provide heat or pressure is required. Storage tanks, processing vessels, tank cars, trailer tanks, pipes, fans, blowers, and duct systems have been successfully processed.

HERESITE & CHEMICAL COMPANY

Manitowoc, Wisconsin

Branch Office: 327 South LaSalle Street, Chicago, Illinois

ough for any steel expansion," dealers say as . . .

crap Reserves Grow

E MINE above the earth" con-
enough scrap to take care of
projected expansion of steel ca-
y.

at's the finding of a preliminary
y made by the National Federa-
of Independent Scrap Yard Deal-
ic., New York.

nensions—It estimates that the
amount of steel in use in the
. is some 1.6 billion tons, of
about 48 million tons becomes
able as potential scrap every

e steel industry's scrap consump-
averages out at about 50 per
of its total melt. Steel takes
of about half its needs with
e" scrap. The remainder must
from the open market. In 1953,
makers consumed 32 million
tons of open market scrap, of
10 million tons came from new
trial scrap. Just 22 million gross
had to be dug from the "mine."

tlook—Based on the current con-
tion rate, the federation esti-
s: When the steel industry has
ded to a capacity of 150 million
only about 25 million tons of
will have to be mined.

ds the federation: "This does
ake into account new steel ton-
being put in use. At present pro-
on rates, this addition to scrap
ves is estimated as high as 70
on gross tons a year." Conclu-
The scrap reservoir, far from
drained, is swelling at a rate
least 40 million tons a year.

a—The federation is renewing
954 petition to have the govern-
make a thoroughgoing study
ie scrap situation. It met with
ur S. Flemming, director, Office
efense Mobilization, earlier this
month. It points out that the $2-billion-a-year scrap industry is a vital part of the nation's defense potential, and asks that resources be studied just as they have been for iron ore and other primary industrial materials.

The federation suggests the Bureau of Mines or the Office of Minerals Mobilization as two agencies qualified to make the analysis. It also puts forward the following outline as basis for study: The amount of iron and steel in use in the scrap reservoir; the average life of that steel; the potential tonnage available annually by uses and sources; annual tonnage added to the reservoir; tonnage lost through rust and other causes; incentives and conservation aspects.

One of the technical developments that may come in the future steel expansion—increased reliance on the oxygen converter—could put new pressure on our scrap resources. One way to get a large steel capacity increase with relatively low capital expenditure is to team the oxygen converter with a blast cupola, which produces pig iron from a 100-per-cent scrap steel charge.

Imported Steel Prices Rise

Import prices on most major steel products from Western Europe continue to increase. Markups range from 10 to 55 cents per 100 lb, the latter applying to hot rolled sheets.

An important exception is plates. Prices are unchanged, but already are $50 a ton or so higher than the general domestic market. Plate deliveries are far extended. So this product is not attracting quite the interest that might be expected in the light of the severe supply shortage.

Prices on furring channels and bright common wire nails are unchanged. Barbed wire is off 5 cents per 100 lb. Prices on oil country pipe are largely nominal, with delivery promises ranging five to six months.

Deliveries on bar-sized angles, structural angles and wide flange beams range three to four months; also merchant bars. Merchant wire products average around six to eight weeks; furring channels, four weeks. Delivery promises on wire rods are well extended, five months in some cases.

Despite the shortages in this country, foreign deliveries on plates, shapes, bars and sheets are not heavy, Volume, however, is increasing.

Wire . . .

Wire Prices, Pages 144 & 145

Heavy demand for finished wire is reflected in rising backlogs in most grades. With consumer inventories generally below normal and

Steel Import Prices

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305...	$6.60	$6.60	$6.60	$7.00
Bar Size Angles	6.50	6.50	6.50	6.90
Structural Angles	6.50	6.50	6.50	6.90
I-Beams	6.50*	6.50*	6.50*	6.90*
Wide Flange Beams	6.50*	6.50*	6.50*	6.90*
Plates	6.95	6.95	6.95	7.35
Sheets, H.R.	8.00	8.00	8.00	8.40
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	28.43	28.43	28.43	30.26
Barbed Wire (†)	5.90	5.90	5.90	6.23
Merchant Bars	6.60	6.60	6.60	7.00
Hot-Rolled Bands	6.60	6.60	6.60	7.00
Wire Rods, Thomas Commercial No. 5	6.05	6.05	6.05	6.45
Wire Rods, O-H Cold Heading Quality No. 5..	6.70	6.70	6.70	7.10
Bright Common Wire Nails	7.65	7.65	7.65	8.05

Oil Country Pipe: Prices on all sizes equalized with Pittsburgh plus barge freight to New Orleans and Houston, where available.

*Nominal. †Per 82-lb, net, reel. §Per 100-lb kegs, 20d nails and heavier.

consumption sustained at a high level, forward buying is more in evidence.

In New England, only demand for fine wire grades is lagging. Spring and upholstery coil requirements are in excess of earlier liberal estimates, notably on automotive account.

Valve and piston ring volume will reach a new high this year, with first quarter production capacity well filled. The same holds for heavier starter springs. For bedsprings and mattresses, an estimated 135,000 tons of hard-drawn 0.50 to 0.60 carbon wire will go into spiral coils.

Hard pressed rod supply will be eased partially by resumption of operations at a rehabilitated Buffalo mill.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 142

Reinforcing steel suppliers are booked solid, four to six months ahead in the Chicago district. Their inventories are hand to mouth. Most bookings are jobs of substantial size, with industrial construction and road work predominating. The only reinforcing product relatively easy to obtain is welded wire mesh.

POPE PRECISION SPINDLE

means finer finishes at lower cost

Look at the super precision double row cylindrical roller bearings and separate thrust bearings, an exclusive feature found only in Pope Spindles.

You won't find bearings like these in other makes of spindles.

The bearings and shafts in Pope Spindles have tremendous load carrying capacity for crush dressing and form grinding. They produce superior, low micro-inch finishes, and assure long, trouble-free operation. There can be *no endwise movement of shafts in either direction.* Operation is always cool. Pope System lubrication is good for the life of the bearings.

YOU CAN SPECIFY POPE SPINDLES WITH CONFIDENCE

Write for Catalog 60A covering the complete range from 1 HP to 15 HP in standard Pope Spindles.

106

Specify POPE PRECISION SPINDLES

POPE MACHINERY CORPORATION
Established 1920.
261 RIVER STREET · HAVERHILL, MASSACHUSETTS

BUILDERS OF THE REVOLUTIONARY NEW POPE SUPER-PRECISION BORING MACHINE THAT BORES HOLES ROUND WITHIN MILLIONTHS OF AN INCH

Sheets, Strip . . .

Sheet & Strip Prices, Pages 143 & 144

There is some question wheth hot rolled is in tighter supply th cold-rolled sheets. But there is doubt that both grades are hard f consumers to get.

Producers in opening their boo on tonnage for shipment after t turn of the year did so for wha ever space they will have availab after carry-overs are taken care Some producers are so far in arrea it is unlikely more than a month six weeks of first quarter producti will be open to apply against ne bookings.

At Pittsburgh, it is reported no integrated mills are having dif culty getting all of the semifinish steel they need to maintain she and strip operations. A bottlene is forming in hot-rolled sheets. Co tributing to the shortage in fla rolled is the elimination of two an quated strip mills by Wierton Ste Co., Weirton, W. Va. Eventual sheet production at that point w be increased through the company three-year expansion program. F the short term, supply will be sho

New England consumers repo they are finding some suppliers hot-rolled sheets are blanked out f two months in the first quarte Other suppliers are reportedly out the market completely.

Steel Bars . . .

Bar Prices, Page 142

Demand for carbon steel bars a pears to be increasing in the Mi west. Chicago district consumers r port they are finding it increasing difficult to get supplies, with m rolling cycles lengthening.

Tight supply conditions are pret general, with demand pressure stro on automotive and farm equipme accounts.

No noticeable loosening in supp conditions, or in demand, is seen hot-rolled bars at Pittsburgh. Col finished bar producers are heavi booked. Indications are that th will have to blank out at least o month of production in the first qua ter to care for year-end arrearage

Automakers are furnishing most the momentum behind demand, b other customers have re-entered t market for substantial tonnage in r cent weeks. Reflecting the divers fied consuming demand in the ma ket, sales to builders of business m chines are gaining.

Calumet Steel and Franklin Ste Divisions of Borg-Warner Corp. ar Inland Steel Co have increased the prices on rail steel merchant bars

4.65 per 100 lb—the same level uoted on reinforcing bars and also quivalent to the price on billet—teel merchant and reinforcing bars.

Tubular Goods . . .

Tubular Goods Prices, Page 146

More production records are being roken as tube mills accelerate oprations. National Supply Co.'s pang Chalfant Division in Ambridge, a., established a new hot mill record n October.

Present tonnage on order books is nore than can be produced and hipped in the remainder of this year, xcept in pipe used in house construcion.

Outlook for all tubular products arly next year: A continuation of resent production rates.

Stainless Steel . . .

Stainless Steel Prices, Page 146

Stainless steel paneling, coated in rhole or in part with bright-hued lazes, makes its architectural debut arly next year, reports the Ameriin Iron & Steel Institute. The first anels will be used in a New York ffice for decorative purposes.

The new product was developed uring research on panel wall strucures sponsored at Princeton Univerity by the institute's Committee of tainless Steel Producers.

Because stainless steel is corrosion esistant, it is not necessary to coat he entire panel. Patterns may be prayed on, showing bar steel interittently, to lend sparkle to the olor glaze. Some panels have rolled-n raised patterns. Glaze can be viped from the high points. On flat urfaces, different colors can be pattered.

Plates . .

Plate Prices, Page 142

For the first time this year, manuacturers doing defense work are havng difficulty getting enough plate onnage. This is an indication of he severe shortage prevailing.

At Pittsburgh, construction firms nd mill equipment builders, whose rder backlogs are substantially bove those of last year, report their teel allotments are based on their 954 purchases. So they are operatng at only 70 to 80 per cent of apacity. They could operate at 100 er cent had they enough steel.

The first quarter holds little prosect for much improvement in supply conditions. The chief producers re promising delivery of November rders in January. With the first month or two of the first quarter reserved for unfilled orders, new tonnage placements for delivery in the first three months of next year are limited.

A large tonnage of stainless plates for two Texas tower radio platforms to be built by Walsh-Portland, Me., will be fabricated by the Lukens Steel Co., Coatesville, Pa. Carbon plates and structurals will be supplied by the Bethlehem Steel Co., Bethlehem, Pa. A third tower, on which the Navy closed bids Nov. 1, will not be built at this time. Steel for these towers take a high allocation rating.

New England shops are meeting with increasing difficulty in placing orders for light gage plates under 5/8-in. This stringency in the lighter gages follows the usual pattern. When producers are swamped with heavy plate orders, they curtail bookings. Unless additional light gage tonnage is available from the sheet mills, supply gets critical, and there is little chance more sheet mill plates will be available soon.

With the ending of the navigation season on the Great Lakes early in December, substantial demand for plates and other steel products is expected for ship repairs. Throughout

Rubber Grows in New York!

In mid-town Manhattan's Rockefeller Center the new 19-story U.S. Rubber Company office building addition is rapidly nearing completion. Thousands of people daily gaze in wonderment at the progress of this new structure for which Ingalls fabricated the steel, again meeting the exacting schedules of today's construction.

U. S. RUBBER COMPANY
Building Addition
Rockefeller Center, Inc., *Owner*
George A. Fuller Company, *Builder*
Harrison & Abramovitz, *Architect*

STEEL fabricated by INGALLS

THE INGALLS IRON WORKS COMPANY
BIRMINGHAM, ALABAMA
Sales Offices: New York, Chicago, Pittsburgh, Houston, Atlanta, New Orleans
Plants: Birmingham, Ala.; Verona, Pa.; Pascagoula, Miss.; North Birmingham, Ala.; Decatur, Ala.

"STUD" NELSON END-WELDS "HANDLES" IN A FLASH!

STUD AS TONG HOLD ON FORGING BILLET

EYE STUD

J STUD

THREADED STUDS AND WING NUTS SECURE TEMPORARY LIFTING BAIL

BENT STUD

Pull the trigger and it's all over. In a split second an eye stud is fused to the head of a hot water heater tank, and the NELWELD® method has solved another materials handling problem by end welding a handle.

There are endless uses for Nelson studs in transporting heavy or awkward materials along the assembly line. Also, some forge shops are welding straight studs to billets to save material, speed up handling and reduce costs.

Whatever your hanging, handling or holding problems, your Nelson Field Engineer is qualified to analyze your requirements. Let him demonstrate how to eliminate expensive and complicated materials handling operations with the NELWELD® method. Write for details, indicating your problem.

Stud Nelson

Fasten it Better at Less Cost with

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NELSON STUD WELDING DIV. OF GREGORY INDUSTRIES, INC. LORAIN, OHIO

the winter the U. S. Steel Corp. fl
will undergo an extensive overh
and repair program, according
Donald C. Potts, president of
Pittsburgh Steamship Division.

Semifinished Steel . .

Semifinished Prices, Page 142

Tightening steel supply is spurri
interest in conversion tonnage. F
mills, however, are in position
handle such business because th
finishing capacity is too fully
cupied. Chicago district produc
report that consumers who frown
on the idea of buying conversion st
a month ago, are looking favoral
in that direction. The inability
get semifinished steel for processi
presents a serious drawback to c
version deals.

A new electric furnace was pla
in production a week ago by Atlan
Steel Co., Atlanta. This top-cha
furnace is the second such unit to
installed by the company within
last three years.

With rated capacity of 75 tons,
can produce more than 125,000 t
of steel annually, increasing the co
pany's ingot capacity by 30 per ce
In addition to the two electric f
naces, Atlantic Steel operates th
open hearths.

A new dust collection system h
been installed in the electric furna
building to eliminate dust and smo

Structural Shapes . .

Structural Shape Prices, Page 142

Extras on junior beams and jun
channels were increased $6 to $
a ton by Jones & Laughlin St
Corp., effective Nov. 21. Prices
pend on the size and weight of
shapes specified. Junior beams a
channels are exclusively produced
J & L.

Base prices continue unchanged.

The increase reflects the tight su
ply condition prevailing in structura
generally. Construction firms
port they can't work at more th
70 per cent of capacity because
shortages of channels, angles a
wide flange beams.

Despite the advancing seas
structural demand continues hea
Inquiry is diversified and includes
number of sizable projects, inclu
ing office buildings, bridges, pow
house installations, public buildin
schools, etc.

Some builders on private accou
are so eager to get position on sha
fabricators' books they are tryi
to place round tonnages with
tailed plans to come later. Oth
builders, confronted with far extend

delivery promises, are deferring action on pending projects.

Prices on fabricated material are definitely stronger than they have been at any time this year.

Not much, if any, improvement in supply conditions is likely in the first quarter. Mill deliveries are running two months behind schedule. This means a substantial portion of first quarter production will have to be devoted to caring for the overflow business from the fourth quarter. Some buyers are ordering more extensively from warehouse stocks.

Tin Plate . . .

Tin Plate Prices, Page 144

Tin plate mills are operating near capacity. Part of the activity is to build up stocks for the next seasonal increase in demand, which is expected to begin in late February or early March. Demand from sources other than canmakers continues to increase.

"European consumption is growing rapidly," according to Ernest T. Weir, chairman, National Steel Corp. Foreign demand is heavy for tin plate and secondaries as well.

Both shipments and production are above average for the fourth quarter. Pressure for quick delivery eased in November. Producers now can fill demands on time.

Shipments of metal cans are running well ahead of last year's. This is indicated by figures announced by the Census Bureau for the first nine months. The total was 3,450,431 tons, against 3,224,651 in the corresponding period of last year. September shipments of 511,428 tons were off seasonally, from 565,220 in August, as revised, and were higher than the 457,983 tons in September, 1954.

Metal cans for fruit and vegetables (including juice) shipped during the first nine months totaled 1,168,644 tons, against 1,085,301 in the corresponding period of last year. Beer cans, second largest category, took 583,519 tons during the first nine months, compared with 515,499 tons in the same period of 1954.

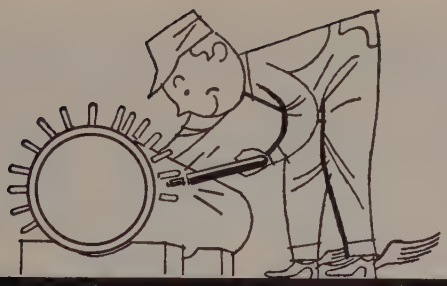
Warehouse . . .

Warehouse Prices, Page 147

Many warehouses are beginning to accumulate a large order backlog. As steel fabricators find first-quarter steel supply will probably be critically short, they are placing orders with distributors for delivery in January and February.

Distributors can sell all the flat-rolled products and structural steel

(*Please turn to page* 159)



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IN A FLASH!

Threshers, harvesters, cornpickers and a wide variety of ginning and combing machinery get their teeth in short order with the NELWELD® System, the trigger-quick way to end-weld studs and other projections to steel. You reduce manufacturing costs, increase production and improve product quality. And with the NELWELD® System, the studs are there to stay!

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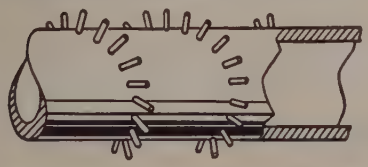

If your product requires teeth, "dogs," or welded projections of any sort, call in a Nelson Field Engineer. He will be glad to study your product design and advise how the NELWELD® System can be used to your advantage. Mail the attached coupon for complete information.

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Please send more information on how to cut costs, improve product design by the NELWELD method.

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NELSON STUD WELDING DIV. OF GREGORY INDUSTRIES, INC. LORAIN, OHIO

Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $90.50; 19-21% Mn, 1-3% Si, $88; 16-19% Mn, $86.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 21.85c per lb of contained Mn, packed, carload 22.9c, ton lot 24.5c, less ton 25.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 11.2c per lb of alloy. Packed, c.l. 12.2c, ton 12.65c, less ton 13.65c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N.Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02 max 38.50c, 0.03 max 38c, 0.06 max 36.50c, 0.1 max 36c, 0.15 max 35.75c, 0.2 max 35.50c, 0.5 max 35.25c, 1.0 max 34c, 1.5 max 33.85c, 2.0 max 33.75c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 8 M x D, bulk 27.4c per lb contained Cr. Packed c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carloads, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.2% min, Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.28. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contact, carload, lump, bulk, 11.75c per lb of contained Si. Packed, c.l. 13.85c, ton lot 15.3c, less ton 16.95c. F.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx, 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c, per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, 14-18% and Si 53-59%). Contract, carlo lump, bulk 22c per lb of alloy, carload pac 23.05c, ton lot 24.95c, less ton 25.95c. livered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, 1.5-3%). Contract, carload, lump, bulk 2 per lb of alloy, carload packed 22.95c, lot 25.25c, less ton 26.75c. Delivered. Spot, 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% each and containing exactly 2 lb of Cr). C tract, carload, bulk, 16.95c per lb of briq carload packed in box pallets 17.15c, in b 17.85c; 3000 lb to c.l. in box pallets 18.3 2000 lb to c.l. in bags, 19.05c; less than 2 lb in bags 19.95c. Delivered. Add 0.25c notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing appr 3 lb and containing exactly 2 lb of M Contract, carload, bulk 12.1c per lb of briq c.l. packed, pallets 12.3c, bags 13.1c; 3 lb to c.l., pallets 13.5c; 2000 lb to c.l., ba 14.3c, less ton 15.2c. Delivered. Add 0.25c notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing appr 3½ lb and containing exactly 2 lb of Mn approx. ½ lb of Si). Contract, c.l. bulk 12 per lb of briquet, c.l. packed, pallets, 12. bags 13.7c, 3000 lb to c.l., pallets, 14.1c; 2 lb to c.l., bags, 14.9c; less ton 15.8c. Deliver Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing prox. 5 lb and containing exactly 2 lb of Contract, carload, bulk 6.75c per lb of briqu packed, pallets, 6.95c; bags, 7.75c; 3000 lb c.l., pallets, 8.55c; 2000 lb to c.l. bags 9.3 less ton 10.25c. Delivered. Spot, add 0.25c

(Small size—Weighing approx. 2½ lb and c taining exactly 1 lb of Si). Carload, b 6.9c. Packed, pallets 7.1c; bags 7.9c; 3 lb to c.l. pallets 8.7c; 2000 to c.l. bags 9. less ton 10.4c. Delivered. Add 0.25c for not ing, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ of Mo each) $1.14 per pound of Mo contain f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or m $3.45 per lb of contained W; 2000 lb W 5000 lb W. $3.55; less than 2000 lb W, $3. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% m C 0.4% max). Contract, ton lot, 2" x $6.90 per lb of contained Cb. Delivered. Sp add 10c.

Ferrotantalum—Columbium: (Cb 40% appro Ta 20% approx., and Cb plus Ta 60% mi 0.30% max). Ton lots, 2" x D, $4.65 per of contained Cb plus Ta, delivered; less lots $4.70.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8 Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carlo packed 1" x D, 45c per lb of alloy, ton 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7 Fe 20% approx.). Contract, c.l. packed ½ 12 M, 18.5c per lb of alloy, ton lots 19.6 less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 11%). C.l. packed, 18.5c per lb of alloy, lots 19.65c; less ton lots 20.9c, f.o.b. Niag Falls, N. Y.; freight allowed to St. Louis.

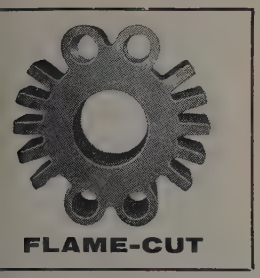
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19 Mn 8-11%). C.l. packed 17.2c per lb of all ton lots 18.7c; less ton lots 19.95c. f.o Niagara Falls; freight allowed to St. Louis.

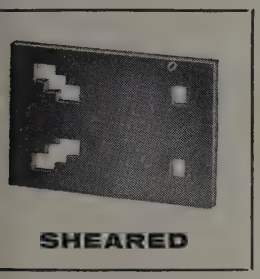
Siminal: (Approx. 20% each Si, Mn, Al; Fe). Lump, carload, bulk 16.50c. Packed 17.50c, 2000 lb to c.l. 18.50c, less than 2 lb 19c per lb of alloy. Delivered.

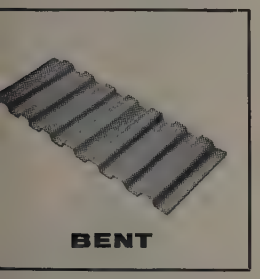
Ferrophosphorus: (23-25% based on 24% content with unitage of $4 for each 1% o above or below the base); carloads, f.o sellers' works, Mt. Pleasant, Siglo, Tenn., per gross ton.

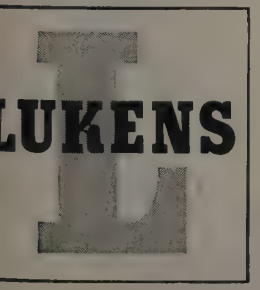
Ferromolybdenum: (55-75%). Per lb o tained Mo, in 200-lb containers, f.o.b. Lan loth, Pa., $1.46 in all sizes except powde which is $1.57; Washington, Pa., furna any quantity $1.46.

Technical Molybdic-Oxide: Per lb contai Mo, f.o.b. Langeloth, Pa., $1.25 in cans; bags, $1.24, f.o.b. Langeloth, Pa.; $1. Washington, Pa.









How much is it costing you?

STEEL PLATE SHAPES SERVICE CAN HELP YOU CUT SCRAP, INVENTORY AND FREIGHT COSTS

If you're searching for ways to pare production costs, look at pre-formed parts. Savings of 5% to 25% are possible when you buy components already shaped from rolled carbon, alloy or clad steel plate.

With By-Products Steel Co.'s Steel Plate Shapes Service, you pay freight only on material you will use. Plate inventories can be reduced and scrap problems virtually eliminated, saving both dollars and space.

Equipment builders find consistent savings right down the line with pre-formed parts. A wide range of finishes, from as-formed to finish-machined, saves production steps. No costly patterns are needed; Steel Plate Shapes Service works directly from blueprints. Over 150 major machines are available to flame-cut, shear, bend, blank or press your parts.

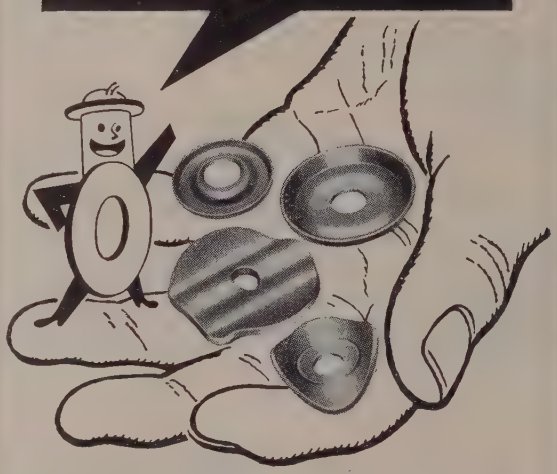
Located next to the mills of the world's leading producer of specialty steel plate, we can work from plates up to 195" wide or 25" thick, form and heat treat them to your specifications. If you wish to find out how you can use this unique service to cut your production costs, write on your letterhead for Bulletin 712. Address: By-Products Steel Company, 742 Strode Avenue, Coatesville, Pennsylvania.

STEEL PLATE SHAPES SERVICE

BY-PRODUCTS STEEL CO.

A Division of Lukens Steel Company, Coatesville, Pennsylvania

Let FREEWAY "One-hit" production cut YOUR costs



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STAMPINGS

Want stampings for less than you ever thought possible? If so . . . then let us explain how our high speed presses (that blank, form and trim in one operation) insure definite savings for you on large production runs! Just send us a print . . . you'll be pleasantly surprised with our quotation.

Freeway washers give you two BIG savings. First, they cost less . . . thanks to special processing. And second, they consistently "meet the specs" to minimize assembly time. Use coupon below.

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( ) Stampings, ( ) Washers, ( ) Bearings.

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Street . . . . . .

City . . . . . State . . . . . .

Signature . . . . . .

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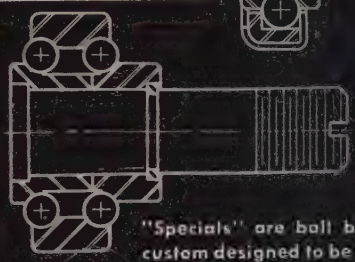
No. 6788 GRAVITY ROLLER CONVEYOR BEARING

No. 6777 BEARING FOR WHEELS OF MONORAIL TRACK TROLLEYS



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"Specials" are ball bearings custom designed to be "exactly right" for a particular application. As "specialists in specials", experienced NICE engineers take advantage of every design opportunity to reduce costs and to improve product performance and appearance. *NICE invites inquiries on YOUR special requirements.*

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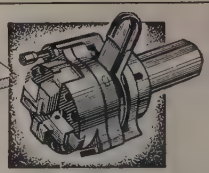

famous for accuracy and straightness of threads, low chaser costs, less downtime, more pieces per day.

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Pacific Coast Representative: *A. C. Berbringer, Inc., 334 N. San Pedro St., Lo Angeles, California.* Canada: *F. F. Barber Machinery Co., Toronto, Canad*

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Grecian Cane Design

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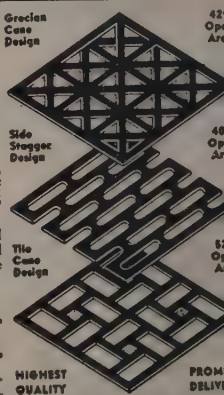

The "Ornamental" light-gauge designs here illustrated are only a few of the many you can choose from in our new Catalog 39 and we are always pleased to quote on original designs or special work of any kind.

For larger unit-openings, using metals up to ¼" in thickness, we offer a wide variety of equally attractive designs in our Catalog 36 on Diamond Architectural Grilles.

Send us your blueprints. We are equipped to fabricate special sections to any desired extent and welcome opportunities to make money-saving suggestions.

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Sales Representatives in all principal cities. Consult Your Classified Telephone Directory.

HIGHEST QUALITY

PROM DELIV

(*Concluded from page* 155)

ey can get. Shortages are hold- down sales. On such products wire and tube, demand generally not so heavy as at the mills.

Unbalanced stocks prevent ware- usemen from accepting many mill- ed orders. First-quarter prospects supplies are discouraging.

Carbuilders and railroads are in- iring for mill-size tonnages of steel om warehouses to no avail. Dis- butor stocks of major hot-rolled oducts are low and broken. Plates d structurals are in critical sup- , while bars and sheets are scarce. Distributors must depend heavily the first quarter on receipt of de- quent shipments from mills. New inage placed for that period is stricted, especially for hot-rolled eets. Some producers have blanked t two months on that product in an tempt to wipe out carry-overs.

In the New York metropolitan ea, despite tightness in the prod- t and uncertainty as to replace- nts, price cutting on galvanized eets has developed.

ig Iron . . .

Pig Iron Prices, Page 147

Blast furnaces produced a record 965,273 net tons of pig iron and rroalloys during October, exceeding e former record, set during May is year, by more than 160,000 tons. he American Iron & Steel Institute, ew York, also said production dur- g the first ten months was at a w high of 64,147,625 tons, about 6,000 tons more than the output of e first ten months of 1953, the ior record period.

Furnace operators in nearly all dis- cts are maintaining production at pacity. Shenango Furnace Co. rhted its No. 1 blast furnace at arpsville, Pa., after a 35-day shut- wn for modernization and relining. With foundry activity at a high tch on the West Coast, melting tes there have advanced.

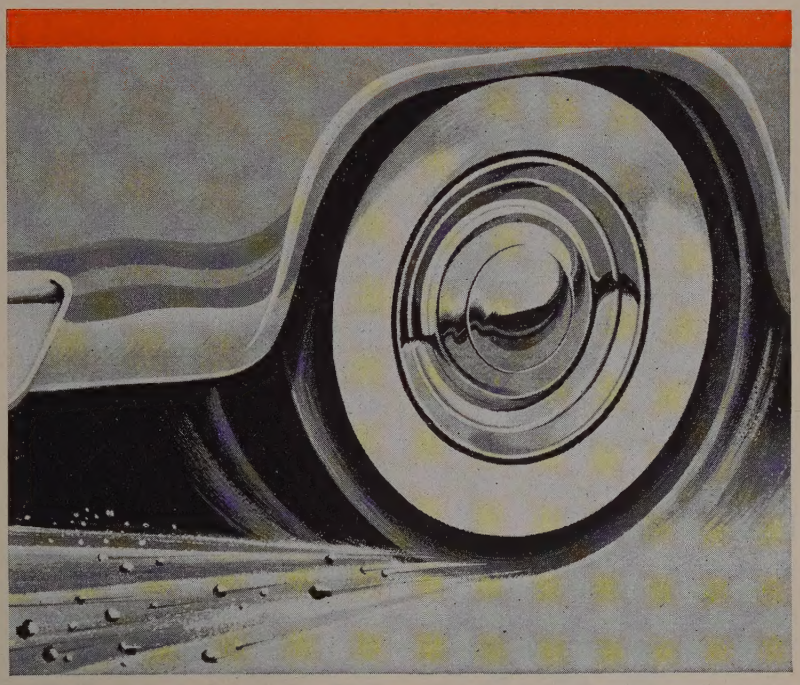
ron Ore . . .

Iron Ore Prices, Page 164

Shipments of Lake Superior iron e in the week ended Nov. 21 to- led 1,789,326 gross tons, reports e Lake Superior Iron Ore Associ- ion. In the preceding week, ship- nts amounted to 2,301,801 tons d in the like week last year, 538,- 9 tons.

Cumulative shipments for the 1955 vigation season to Nov. 21 were ,869,058 tons. This compares with ,328,272 tons moved up to Nov. 21 the 1954 season.

Only 16 of the 260 vessels in the



when 150 200 250 300+ horsepower

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forgings must bear the brunt of modern power!

• Modern cars, *powerful, responsive,* stress metal parts as never before.

For safety, for economy, critical parts should be forgings, fully trustworthy as to soundness and fatigue properties. Engines, transmissions, running gear serve more dependently when forged components are used.

Throughout industry manufacturers are learning that nothing is so indispensable as a forging — because a forging is trustworthy in service — because it has soundness that reduces costs for inspection, machining, rejections, and replacements. Send for the booklets, explaining these advantages and telling how you can have a Forging Engineer help you make economy studies revealing ways to improve your product or your process with forgings.

closed-die **forgings** for metal you can trust

DROP FORGING ASSOCIATION
605 Hanna Building • Cleveland 15
Symbolic emblem of the Drop Forging Association

Attach this advertisement signature to your letterhead and mail to Drop Forging Association to receive booklet "What is a Forging?" ☐ or "Management Guide to Use of Forgings". ☐ Check title or titles desired.

Great Lakes iron ore fleet are not in operation. Laying up for the winter will accelerate from here on, however.

Consumption of Lake Superior iron ore totaled 7,850,438 gross tons in October, bringing use for the first ten months of the year to 73,255,190 tons, according to Lake Superior Iron Ore Association. This compares with consumption of 7,538,666 tons in September, and 5,398,398 tons in October last year. Consumption in the first ten months of 1954 totaled 54,840,899 tons.

Stocks on lower lake docks and at furnaces on Nov. 1 amounted to 49,523,032 gross tons. This compares with 45,406,437 tons on Oct. 1 and with 51,868,432 tons on Nov. 1, 1954.

Rails, Cars . . .

Track Material Prices, Page 145

Domestic freight car orders in October totaled 12,843 units, compared with 3228 in September.

Freight car deliveries increased slightly from 3118 in September to 3722 in October.

Car orders as of Nov. 1 totaled 61,954, compared with 52,914 on Oct. 1 and 12,853 on Nov. 1, 1954.

Railroads, pressing for car steel, are receiving some political backing.

Shipments of Steel Products—September, 1955

(All Grades; Net Tons)

PRODUCTS	Carbon	Alloy	Stainless	Total Nine Months 1955	195
Ingots	46,184	17,835	1,982	444,116	251,
Blooms, slabs, etc.	170,054	50,825	2,279	2,076,483	1,086,
Skelp	17,013	.....	.....	131,789	92,
Wire rods	105,573	2,009	549	865,922	573,
Structurals	421,535	4,140	21	3,431,869	3,478,
Steel piling	33,134	53	.....	279,849	290,
Plates	583,992	33,206	1,953	4,838,887	4,076,
Rails—standard	89,224	.....	.....	918,578	981,
Rails—other	5,380	.....	.....	56,505	66,
Joint bars	5,435	.....	.....	53,621	57,
Tie plates	24,011	.....	.....	240,815	211,
Track spikes	7,310	.....	.....	72,674	56,
Wheels	28,457	73	.....	220,981	148,
Axles	11,165	25	.....	83,052	45,
Bars—hot rolled	547,637	186,526	4,497	6,392,086	4,529,
Bars—reinforcing	186,165	.....	.....	1,574,315	1,338,
Bars—cold drawn	128,509	24,815	4,572	1,366,402	877,
Tool steel	1,250	8,168	.....	83,042	62,
Standard pipe	253,160	232	5	2,194,642	1,750,
Oil country goods	184,082	38,173	.....	1,856,914	1,803,
Line pipe	294,701	.....	.....	2,280,896	2,168,
Mech. tubing	54,567	25,163	370	697,511	501,
Pressure tubing	19,469	1,373	1,350	197,492	216,
Wire—drawn	265,436	4,184	2,769	2,348,604	1,771,
Nails & staples	58,321	.....	.....	523,234	442,
Wire—barbed	5,161	.....	.....	101,974	114,
Wire—fence	21,423	.....	1	269,100	255,
Bale ties	3,687	.....	.....	53,662	45,
Black plate	87,876	.....	.....	616,512	531,
Tin plate—HD	116,295	.....	.....	915,775	1,100,
Tin plate—electro.	471,624	.....	.....	3,750,257	3,082,
Sheets—hot rolled	734,535	30,985	2,815	6,922,604	4,294,
Sheets—cold rolled	1,222,236	6,260	12,980	10,981,152	6,733,
Sheets—galvanized	269,020	.....	.....	2,087,155	1,752,
Sheets—other coated	24,974	.....	.....	199,670	125,
Sheets—enameling	20,974	.....	.....	162,085	126,
Sheets—electrical	10,732	58,910	.....	584,513	433,
Strip—hot rolled	168,118	3,047	524	1,546,656	1,052,
Strip—cold rolled	123,585	1,373	22,605	1,251,209	918,
Total shipments	6,821,600	497,375	59,272	62,672,603	47,450,

This announcement appears as a matter of record only.

Union Tank Car Company

$25,000,000

3¾% Sinking Fund Debentures

due October 15, 1975

196,406 Shares

Common Stock

No par value

Private placement of the above securities has been arranged through the undersigned.

Smith, Barney & Co. Blunt Ellis & Simmons

November 10, 1955

crap . . .

Scrap Prices, Page 162

Philadelphia — Scrap prices gen-lly are higher, reflecting good do-stic demand and a substantial vement for export. Shipments s month from this port will be heaviest in some time, totaling 000 tons.

No. 1 heavy melting, No. 1 bundles No. 1 busheling have been ad-nced to $48, delivered. No. 2 heavy lting is higher at $43; and No. 2 ndles are $38. Several other steel ades are also up. So are the cast ms.

Chicago—Several important grades steelmaking scrap have advanced a ton, climaxing the strong mar-tone prevailing for more than ee weeks. Tonnage involved in new purchases was sizable. In-ded were No. 1 industrial heavy lting at $47; No. 1 dealer heavy lting at $44; No. 1 factory bundles $48; and No. 1 railroad heavy lting at $50. Blast furnace mate-l is not sharing in the new mar-strength.

Pittsburgh — Stainless steel scrap tinues its rapid price rise in 18-8 ades. Mill production of stainless approaching 100 per cent of ca-city, and stocks are dwindling. ces paid for 18-8 bundles and ds are above $300 a ton and con-ue to rise. The trend is toward 0 a ton.

There's no trend in No. 1 heavy ting scrap. Strength in certain t iron and railroad scrap grades ulted in price increases ranging m $1 to $3 a ton.

New York—Brokers' buying prices No. 1 heavy melting and No. 1 ndles have been advanced to $42-.50. Prices are higher: On ma-ne shop turnings at $21-$22; on xed borings and turnings at $22-; and on short shovel turnings at -$24.Heavy breakable cast prices ve been increased to $39-$40. Buy-is brisk on both domestic and eign account.

Cleveland — Although little new ing is reported, the scrap market e continues strong. Mills are ex-ted to re-enter the market active-around Dec. 1. Meanwhile, high elmaking operations are cutting mill inventories at a time of the r when collections and prepara-n activities usually are hampered bad weather.

Detroit—Brokers anticipate higher ces to be bid on soon-to-close omotive lists. Increases are par-ularly expected in the No. 1 ades. No. 1 heavy melting is quoted at $40; machine shop turnings, $21.

Birmingham — Because steel mills with large scrap inventories seem determined to hold the price line, and dealers are determined not to sell at present levels, there is little activity in the open-hearth grades of scrap. Electric furnaces are operating at capacity. With stocks none too large, buying prices have increased on electric furnace grades. Some cast iron consumers have been trying to buy scrap above the going market, but have not had much success.

Los Angeles—For most scrap dealers, November was a shade slower than October. Despite this, fourth quarter volume will surpass that in the like period last year, when sales dwindled to almost nothing.

San Francisco—Steel scrap prices are holding firm on steady demand. Supplies are reported ample, but the rainy season is slowing deliveries.

Seattle—An outside buyer announced a drop of $4 in the prices on No. 1 and No. 2 heavy melting steel. Local dealers report previous levels ($44 and $40, respectively) are still being paid, and express doubt that any volume of scrap can be obtained at $4 under those prices.

(*Please turn to page* 164)

they all know the best place in Cleveland

"Hotel Cleveland, sir?"

Whether you arrive by train, plane or car, the friendliest place to stay is Hotel Cleveland, directly connected with Union Terminal.

No room charge for children under 14 when registered with an adult.

Hotel Cleveland

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Distinguished American Landmarks
CHICAGO: Edgewater Beach Hotel
BOSTON: Hotel Somerset
NEW YORK CITY: Ritz Tower Hotel
CLEVELAND: Hotel Cleveland

FOR SALE

By order of the U. S. District Court, Eastern District of Wisconsin, Milwaukee, Wisconsin

ALL OF THE OPERATING ASSETS OF THE BANKRUPT

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STEEL FABRICATORS

consisting of approximately 71 acres of land, on state and federal highways, adjacent to C & N W R'y mainline with tracks running into main building; buildings, machinery and equipment, automobiles and trucks, furniture and fixtures, inventory and work in process and assignment of executory contracts and orders for the production of goods, and furnishing labor and materials.

AN UNUSUAL OPPORTUNITY FOR A LARGE COMPANY TO DISPERSE ITS OPERATIONS OR FOR A SMALLER MANUFACTURER OF HEAVY MACHINERY OR FABRICATING TO TAKE OVER A GOING CONCERN WHICH HAS NOT BEEN CLOSED FOR A SINGLE DAY AND HAS OPERATED WITH SUBSTANTIAL NET PROFIT UNDER THE TRUSTEE.

For more detailed information and inventory, and terms of sale and bidding, write Mr. Frank Cartier, Trustee, Northeastern Boiler & Welding, Ltd., Green Bay, Wisconsin.

U. S. DISTRICT COURT FOR EASTERN DISTRICT OF WISCONSIN, MILWAUKEE, WILL RECEIVE BIDS THEREFOR ON DECEMBER 5, 1955, AT 2 O'CLOCK P.M., IN OPEN COMPETITIVE BIDDING.

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Nov. 23	$46.33
Nov. 16	45.67
Oct. Avg.	45.17
Nov. 1954	33.33
Nov. 1950	41.33

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer's plant)

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	45.00-46.00
No. 2 bundles	36.00-37.00
No. 1 busheling	45.00-46.00
Machine shop turnings	*30.00-31.00*
Mixed borings, turnings	*30.00-31.00*
Short shovel turnings	33.00-34.00
Cast iron borings	33.00-34.00
Cut structurals, 3 ft lengths	49.00-50.00
Heavy turnings	42.00-43.00
Punchings & plate scrap	49.00-50.00
Electric furnace bundles	48.00-49.00

Cast Iron Grades

No. 1 cupola	42.00-43.00
Charging box cast	*42.00-43.00*
Heavy breakable cast	*42.00-43.00*
Unstripped motor blocks	*30.00-31.00*
No. 1 machinery cast	*51.00-52.00*

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
Rails, 2 ft and under	*60.00-61.00*
Rails, 18 in. and under	*61.00-62.00*
Rails, random lengths	56.00-57.00
Railroad specialties	54.00-55.00

Stainless Steel Scrap

18-8 bundles & solids	*310.00-320.00*
18-8 turnings	*180.00-190.00*
430 bundles & solids	100.00-110.00
430 turnings	60.00-65.00

CLEVELAND

(Delivered consumer's plant)

No. 1 heavy melting	45.00-46.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	45.00-46.00
No. 2 bundles	35.00-36.00
No. 1 busheling	45.00-46.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	27.50-28.50
Short shovel turnings	27.50-28.50
Cast iron borings	27.50-28.50
Low phos.	45.00-46.00
Cut structural plates 2 ft and under	*51.00-52.00*
Alloy free, short shovel turnings	31.00-32.00
Electric furnace bundles	45.50-46.50

Cast Iron Grades

No. 1 cupola	*48.00-49.00*
Charging box cast	40.00-41.00
Stove plate	46.00-47.00
Heavy breakable cast	37.00-38.00
Unstripped motor blocks	29.00-30.00
Brake shoes	35.00-36.00
Clean auto cast	48.00-49.00
Burnt cast	37.00-38.00
Drop broken machinery	*50.00-51.00*

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	53.00-54.00
Rails, 2 ft and under	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Rails, random lengths	58.00-59.00
Cast steel	48.00-49.00
Railroad specialties	54.00-55.00
Uncut tires	49.00-50.00
Angles, splice bars	54.50-55.50
Rails, rerolling	63.00-64.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	290.00-300.00
18-8 turnings	130.00-140.00
430 clips, bundles, solids	90.00-100.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer's plant)

No. 1 heavy melting	47.50-48.50
No. 2 heavy melting	35.00-36.00
No. 1 bundles	47.50-48.50
No. 2 bundles	32.00-33.00
No. 1 busheling	47.50-48.50
Machine shop turnings	24.00-25.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Low phos.	47.50-48.50
Electric furnace bundles	47.50-48.50

Railroad Scrap

No. 1 R.R. heavy melt.	48.00-49.00

CHICAGO

No. 1 heavy melting	*44.00-47.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 factory bundles	*47.00-48.00*
No. 1 dealer bundles	43.00-44.00
No. 2 bundles	33.00-34.00
No. 1 busheling	*44.00-47.00*
Machine shop turnings	27.00-28.00
Mixed borings, turnings	29.00-30.00
Short shovel turnings	29.00-30.00
Cast iron borings	29.00-30.00
Cut structurals, 3 ft	*48.00-49.00*
Punchings & plate scrap	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	*48.00-49.00*
Stove plate	*39.00-40.00*
Unstripped motor blocks	*35.00-36.00*
Clean auto cast	*51.00-52.00*
Drop broken machinery	*51.00-52.00*

Railroad Scrap

No. 1 R.R. heavy melt	*49.00-50.00*
R.R. malleable	*57.00-58.00*
Rails, 2 ft and under	60.00-61.00
Rails, 18 in. and under	61.00-62.00
Angles, splice bars	57.00-58.00
Rails, rerolling	66.00-67.00

Stainless Steel Scrap

18-8 bundles & solids	320.00-335.00
18-8 turnings	225.00-235.00
430 bundles & solids	100.00-105.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*40.00*
No. 2 heavy melting	30.00
No. 1 bundles	*40.00*
No. 2 bundles	28.00
No. 1 busheling	*40.00*
Machine shop turnings	*21.00*
Mixed borings, turnings	22.00
Short shovel turnings	24.00
Punchings & plate scrap	48.00

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	33.00
Stove plate	32.00
Heavy breakable	32.00
Unstripped motor blocks	22.00
Clean auto cast	44.00
Malleable	35.00

BIRMINGHAM

No. 1 heavy melting	*40.00-41.00*
No. 2 heavy melting	35.00-36.00
No. 1 bundles	38.00-39.00
No. 2 bundles	28.00-29.00
No. 1 busheling	38.00-39.00
Cast iron borings	17.00-18.00
Short shovel turnings	28.00-29.00
Machine shop turnings	27.00-28.00
Electric furnace bundles	*46.00-47.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	*49.00-50.00*
Structural plate, 2 ft	*48.00-49.00*
Unstripped motor blocks	36.00-37.00
Charging box cast	30.00-31.00
No. 1 wheels	38.00-39.00

Railroad Scrap

No. 1 R.R. heavy melt	*46.00-47.00*
Rails, 18-in. and under	*59.00-60.00*
Rails, rerolling	*60.00-61.00*
Rails, random lengths	53.00-54.00
Angles, splice bars	55.00-56.00

PHILADELPHIA

(Delivered consumer's plant)

No. 1 heavy melting	*48.00*
No. 2 heavy melting	*43.00*
No. 1 bundles	*48.00*
No. 2 bundles	*38.00*
No. 1 busheling	*48.00*
Electric furnace bundles	*49.00†*
Machine shop turnings	*30.50-31.00*
Mixed borings, turnings	*30.50-31.00*
Short shovel turnings	*33.00*
Structurals & plate	*50.00-51.00*
Heavy turnings	*43.00-44.00*
Couplers, springs, wheels	53.00
Rail crops, 2 ft & under	59.00-60.00

Cast Iron Grades

No. 1 cupola	*44.00-47.00*
Malleable	*61.00*
Heavy breakable cast	*47.00*
Drop broken machinery	*52.00-53.00*

†Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*42.00-42.50*
No. 2 heavy melting	37.00-38.00
No. 1 bundles	*42.00-42.50*
No. 2 bundles	32.00-33.00
Machine shop turnings	*21.00-22.00*
Mixed borings, turnings	*22.00-23.00*
Short shovel turnings	*23.00-24.00*
Low phos. (structural & plate)	42.50-43.50

Cast Iron Grades

No. 1 cupola	37.00-38.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	*39.00-40.00*

Stainless Steel

18-8 sheets, clips, solids	290.00-300.00
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.50-40.00
No. 2 heavy melting	33.00-35.50
No. 1 bundles	37.50-39.00
No. 2 bundles	28.00-28.50
Machine shop turnings	21.00-21.50
Mixed borings, turnings	23.00-23.50
Short shovel turnings	24.00-24.50
No. 1 cast	36.00-36.50
Mixed cupola cast	34.00-34.50
No. 1 machinery cast	39.00-39.50

BUFFALO

No. 1 heavy melting	43.00-44.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	43.00-44.00
No. 2 bundles	32.00-33.00
No. 1 busheling	43.00-44.00
Mixed borings, turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Short shovel turnings	30.00-31.00
Cast iron borings	30.00-31.00
Low phos.	47.00-48.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	47.00-48.00
Rails, 2 ft and under	51.00-52.00
Railroad specialties	48.00-49.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	35.00-36.00
No. 1 bundles	41.00-42.00
No. 2 bundles	32.00-33.00
No. 1 busheling	41.00-42.00
Machine shop turnings	25.50-26.50
Mixed borings turnings	24.75-25.75
Short shovel turnings	28.00-29.00
Cast iron borings	24.75-25.75
Low phos., 18 in.	50.00-51.00

Cast Iron Grades

No. 1 cupola	43.50-44.50
Heavy breakable cast	41.00-42.00
Charging box cast	41.00-42.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	44.00-45.00
Rails, 18 in. and under	60.00-61.00
Rails, random lengths	53.00-54.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	3
No. 2 heavy melting	3
No. 1 bundles	3
No. 2 bundles	3
Machine shop turnings	1
Short shovel turnings	2

Cast Iron Grades

No. 1 cupola	4
Charging box cast	3
Heavy breakable cast	3
Unstripped motor blocks	2
Brake shoes	3
Clean auto cast	4
Stove plate	4

Railroad Scrap

No. 1 R.R. heavy melt.	4
Rails, 18 in. and under	6
Rails, random lengths	5
Rails, rerolling	6
Angles, splice bars	5

SEATTLE

(Delivered consumer's plant)

No. 1 heavy melting	4
No. 2 heavy melting	4
No. 1 bundles	1
No. 2 bundles	1
No. 3 bundles	1
Machine shop turnings	15.00-1
Mixed borings, turnings	15.00-1
Short shovel turnings	15.00-1
Electric furnace, No. 1	1

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	4
Heavy breakable cast	1
No. 1 wheels	1
Unstripped motor blocks	1
Clean motor blocks	1
Stove plate (f.o.b. plant)	1
Brake shoes	1

Railroad Scrap
(Delivered consumer's plant)

Rails, random lengths	1

LOS ANGELES

No. 1 heavy melting	1
No. 2 heavy melting	1
No. 1 bundles	1
No. 2 bundles	1
Machine shop turnings	1

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	43.00-

SAN FRANCISCO

No. 1 heavy melting	
No. 2 heavy melting	
No. 1 bundles	
No. 2 bundles	
No. 1 busheling	
Machine shop turnings	
Mixed borings, turnings	
Short shovel turnings	
Cast iron borings	
Cut structurals	
Heavy turnings	
Punchings & plate scrap	

Cast Iron Grades

No. 1 cupola	47.00-
Charging box cast	
Stove plate	
Heavy breakable cast	
Unstripped motor blocks	
Brake shoes	
Clean auto cast	
No. 1 wheels	
Burnt cast	
Drop broken machinery	

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	
No. 2 heavy melting	
No. 1 bundles	
No. 2 bundles	
Mixed steel scrap	
Mixed borings, turnings	
Rails, remelting	
Busheling, new factory: Prepared	
Unprepared	
Short steel turnings	

Cast Iron Grades†

No. 1 machinery cast	42.00-

†F.o.b., shipping point.